COAL AGE

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A Word About Our Wives

The women of our mining camps are slowly but surely coming into their own.

IT'S a long jump from the daily bath that the average coal digger used to take in his kitchen (using a tub filled with water heated by his wife on the family cookstove, the water being carried to the house a block or two by her from the nearest hydrant or well) to the daily bath that the miner now gets in a modern bathhouse a few steps away from the pit mouth, but some distance from home. The one who appreciates the change most and yet was never consulted in the matter is the same wife who once upon a time carried the water to fill the family tub.

And it's a still longer jump from the leaky, ramshackle shanties of yesterday to the neat, convenient dwellings of many mining camps today, and here again only the wives realize the completeness of the change.

The miner underground at his working face has no need to worry about the rain that laughs at the leaky roof on his dwelling, and if perchance it should rain when he is home at night, he is more than apt to be so sleepy that he will forget the unpleasantness before morning.

Likewise the patches of paint, still clinging desperately to his dwelling as a sort of reminder of a coat of paint that has long since outlived its usefulness, make no impression upon him, largely because he sees them only on Sundays and holidays, and at such times the daylight paints everything for him in colors of gold and silver.

But the women—they have been driven to despair by the leaky roofs and have felt disgraced by the forbidding exteriors so long that the sightly houses now available with modern conveniences seem like dream homes.

It seems strange that in the past the wives, sisters and mothers in the mining camps should have received so little consideration from the operators. Pinning ourselves down to actual facts, the women don't get any too much consideration at the present time. Many of the improvements that are now so conspicuous have been adopted because the men seemed to demand them—not for their wives, but for themselves.

And getting back to actual facts, it is doubtful if there is a class of women in the world today who have a harder life, and have as few pleasures and more chances to suffer from great disasters than the wives of our coal-mining men.

It is also doubtful if there are many women in the world today, taking them en masse, who raise larger families; for that reason they deserve every possible consideration from the industry that has crying need for their sons.

If you think we exaggerate the indifferent treatment extended to our women, get out all of the articles you have read and recall all of the discussions you have heard and see if the word woman is mentioned frequently.

A New Method of Putting in Survey Stations

By H. C. Austin*

SYNOPSIS—Although sight stations are frequently placed on entry timbers, they are less liable to damage if placed directly in the roof. For drilling holes for the plugs to hold the sight spads, a Yankee drill may be used to advantage.

For some time I have been seeking a convenient, accurate and rapid means of installing survey stations, especially for entry and room sights in coal mines. I recently adopted a method which I believe fills the requirements completely. This method may be in use by others, but as I have never seen any description of it, it occurred to me that it might solve a rather vexing problem for others.

Under ordinary conditions, at least in Iowa, the entry timbering is from 100 to 300 ft. and often farther from the face of the entry. This condition applies especially to entries on which rooms are being turned by others than the entrymen, and the first few shots play havoc with the entry timbers. Furthermore, when the coal is not of sufficient height to permit of the entry being timbered without brushing, it is the custom to keep the timbering back until a sufficient amount of the roof has fallen to secure the necessary height.

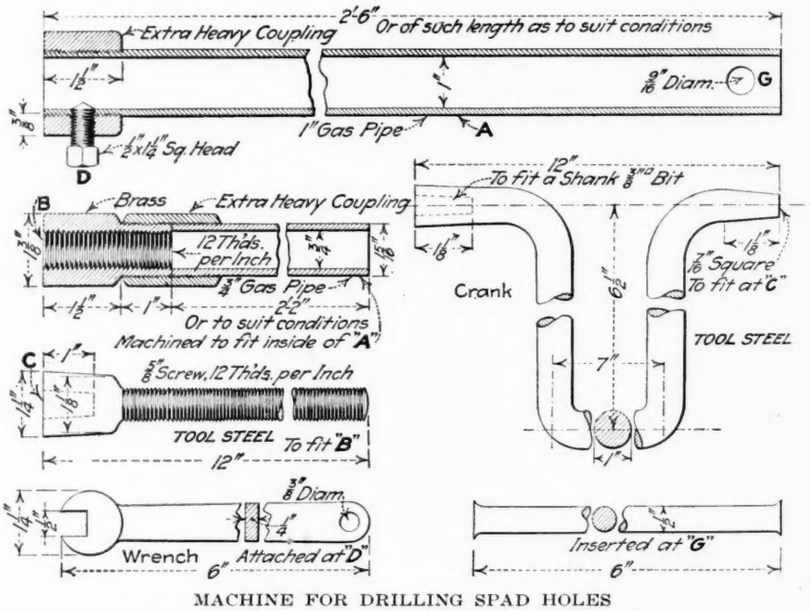
I rather favor survey stations in the roof in preference to placing them on collars or crossbars. However, it is preferable to have them so placed that the station is close to a crossbar for convenience in marking and as a protection against the roof loosening, and thus rendering the station useless.

I use such stations at which sights have been placed for permanent survey stations when they have not been destroyed, before the entries have been timbered. The timbermen are therefore instructed to place the crossbars near but not covering the station. The objection to placing permanent stations on crossbars is because these bars are often slightly moved by wrecks in the entry or from the timbermen happening to drive a piece of lagging after the stations are installed. This condition opens a grave source of error to the surveyor, without a ready means of detecting its existence. A station in the roof, on the other hand, should be free from such sources of error. In case the roof should have loosened any dislocation can be detected by taking the precaution to sound the roof before using the station.

Naturally squeezes or large movements are not taken into account here, for these movements usually make themselves known otherwise. It has been my experience that when entry sights are kept comparatively close to the working face they are used oftener than when farther back. It is easier for a man to take his sights when they are close to the face.

I have also found sight spads dug out of the roof for no other reason than that they were too far from the face, the entryman knowing that when the sights were removed they would be replaced nearer to the face. This condition, coupled with the fact that the roof is usually slabbing off when not timbered, makes a constant repetition of putting up sights, and hence the advantage of finding a ready and rapid means of performing this operation.

One method often used for this work is slow and unsatisfactory. A hole is made in the roof with a miner's pick, a plug driven therein and a spad placed in the plug. This method consumes much time, not only to dig the holes and make the plugs to fit them, but the plugs, which never fit the holes securely, either shrink from drying and fall out or swell and push themselves out, and the work has to be done over again. It takes from 10 to 15 min. to put in a pair of sights in this manner.



MACHINE FOR DRILLING SPAD HOLES

Another method which I have used includes the use of a drilling machine, as illustrated. This method proved satisfactory in every way, except that the drill was somewhat awkward and heavy to carry around in the mine. It is, however, extremely simple, and may be made in any machine shop. The machine will bore a hole in the hardest shale roof quickly and with but little effort. The weight and strength of the drill may be varied to suit local conditions, although the one illustrated was found to be of sufficient strength to drill an exceptionally hard roof.

*Consolidated Indiana Coal Co., Melcher, Iowa.

After locating the hole with the transit, the machine is set up and the part *B* drawn out until the bit comes in contact with the roof, when the setscrew *D* is tightened and the hole drilled from 2 to 3 in. deep. After taking the machine down, the plug and spad are driven. The plumb-bob is then inserted in the spad and brought into line by tapping with a hammer, either to the right or left as the case may be. Naturally the more care employed in locating the hole for the drill the less will the spad have to be moved.

At the present time I have abandoned this method for the one hereafter described, which is so simple, handy and satisfactory that it would seem that it should have come into general use long ago. Instead of using the machine illustrated, I now drill the holes for the plugs with a Yankee drill, with which type of boring machine almost everyone is familiar. It is a spring drill in that by pushing on the handle a screw revolves the bit, the return of the handle being accomplished by a concealed coil spring. The drilling may consequently be done with one hand.

Other types or varieties of these or similar drills might, however, be more convenient than the one which I employ. The maximum size of bit ordinarily furnished with these drills is $^{11}/_{64}$ in. However, I have adopted a ¼-in. bit to fit the drill, and while it seems a trifle large for this type of machine, yet it works satisfactorily in the shale roof of the local mines. There was no particular reason for adopting the larger bit except the fact that we ran out of the small size, and it became necessary to use a larger bit until we could be supplied with the regular size.

The fact of the plugs being smaller than those used with the outfit shown in the illustrations limits the lateral movement of the spad, yet I have experienced no trouble in having to redrill holes. The less a spad may be moved after being driven the better, as any movement tends to loosen it in the plug and might be the cause of error later. However, with the small $^{11}/_{64}$-in. drill, a Keuffel & Esser spad will almost fill the hole, and anything but the slightest lateral movement will drive the spad against the side of the hole, bending it before loosening it appreciably.

With an experienced helper, I should judge that at least 75 per cent. of the spads placed need not be moved more than the width of a plumb-bob string to be on line. When the roof can be seen from the last station, a sight may be taken on the drill held to the roof, and when this is in the proper place, drilling can be commenced.

This drill is exceedingly handy when the roof is high, as a hole may be made as far up as one can reach with one hand. It only takes a few seconds to drill a hole, and it is an easy matter to extend a pair of sights between trips of the driver. The drill is small and light and may be easily carried in the pocket. The plugs are also small, and a pocketful will last a day or more. They may also be made with a knife by the helper while the instrument is being set up.

Under ordinary conditions it takes longer to set up the instrument than to drill the two holes and complete the work for the sights. Of course the speed of drilling depends somewhat on the roof, but a hole may be made in a brick with one of these drills, although this is quite hard on the bit. A soft top, which is inclined to stick to the bit, is somewhat bothersome, although it is possible that a special bit with more clearance back of the point would help in this kind of roof.

It is quite possible that roof conditions may be encountered which would make recourse to the heavier machine shown in the drawing necessary. Several of my personal friends have, however, been using a drill of this kind or one similar to it for some time and are quite enthusiastic in its praise. This is my excuse for attempting to enlighten the mine-surveying fraternity on what my friends term "a good thing."

Unreasonable Increases in the Anthracite Taxes

According to statistics compiled by the Bureau of Railway Economics at Washington, the taxes paid by the railroads of the United States have increased in the ten years between 1905 to 1914 inclusive from $63,474,679 to $150,371,000, or 137 per cent. The taxes paid by the roads classed as anthracite carriers showed an increase from $5,590,214 to $17,226,144, or 208.15 per cent. Thus the anthracite carriers had their rate of taxation increased 50 per cent. more than did the average railroad in the United States. In this connection it is interesting to note to what extent the taxes paid by the anthracite-mining companies have been increased.

The Anthracite Bureau of Information at Wilkes-Barre has been compiling some statistics of this kind, and while the information is not complete, enough has been obtained to show some rather striking comparisons. Companies producing 20 per cent. of the total anthracite output in 1914 paid $403,227 in taxes in 1904 and $1,035,032 in 1910, an increase of more than 150 per cent. in six years. If the 2½-per cent. valuation tax had been upheld by the State Supreme Court, the taxes for the same companies would have amounted in 1914 to $2,616,067, or nearly six and one-half times the amount paid in 1904. Upon the same basis the total taxes payable by all the anthracite companies in 1914 would have amounted to over $13,000,000 or about 7 per cent. of the value of the 81,000,000 tons produced that year.

It is to be noted that these taxes for 1914 (if the 2½-per cent. valuation tax had held) would have shown an increase of more than 150 per cent. over 1910. The $13,000,000 of taxes would be at the rate of about 25c. a ton on all of the domestic sizes of anthracite produced in that year.

Another interesting thing to note in connection with the mysteries of taxation in the anthracite region is that, notwithstanding the depletion of the coal beds by the extraction of the coal, the assessment values of the properties are constantly appreciating. From 1907 to and including 1914 over 600,000,000 tons of anthracite have been mined, and yet according to the tax assessors some of the properties have doubled in value. The same companies that reported the increase in taxes show an appreciation of assessed valuation of their properties from $41,200,000 to $92,163,000. In most of the anthracite-producing counties more than 75 per cent. of the taxes are paid by the mining companies, and in one township of Luzerne County 98 per cent. of the total taxes are paid by two companies. There is one small leasehold, also in Luzerne County, from which the owners of the land receive in royalty a return which is barely enough to pay the taxes which are assessed on the property.

How To Splice Wire Rope

By C. J. Fuetter*

It is often the case where wire rope is used that in case of a breakdown no man can be found on the job who can splice the severed ends, and naturally there is much time lost in securing some outside man to do the work. Splicing a rope is generally regarded as a mysterious process whereas almost anyone can learn in a few hours how to do it. The accompanying illustrations show how a substantial wire-rope splice may be effected with ease and rapidity.

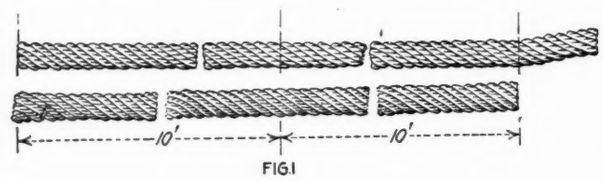


FIG.1

FIG2

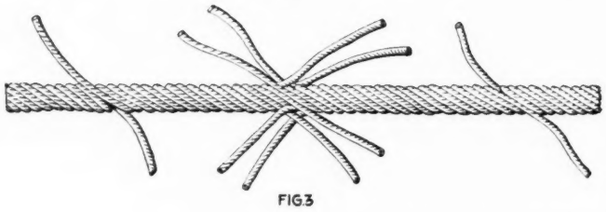


FIG3

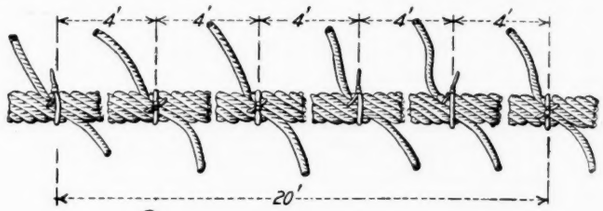


FIG.4

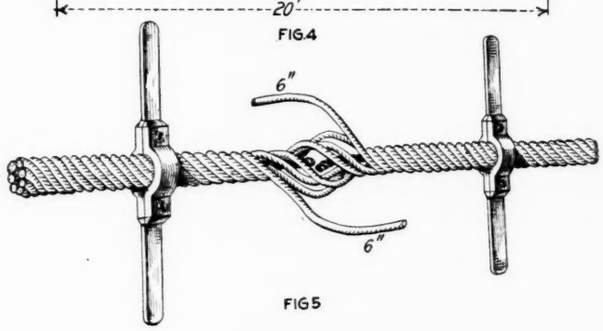


FIG5

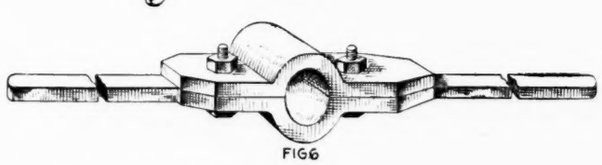


FIG6

THE SUCCESSIVE STEPS IN ROPE SPLICING AND THE CLAMPS EMPLOYED

A hammer and a cold chisel for cutting off ends of strands, a steel fid or marlinspike for separating strands, two clamps for untwisting the rope, a sharp pocket knife for cutting the hemp core and a wooden mallet are all the tools needed. When starting to splice, proceed in this order: First, lay the rope on the ground, with ends overlapping 20 ft., 10 ft. each way from the center, as shown in Fig. 1.

Second, unlay the strands of both ends of the rope for a distance of 10 ft., as shown in Fig. 2. Cut off the hemp cores close up on both sides and bring the strands together so that the opposite strands will interlock regularly with each other.

Third, unlay strand 1^a and follow up with strand 1 of the other end, laying it tightly in the open groove made by unwinding 1^a; make the twist of the strand agree exactly with the twist of the open groove. Proceed with this until all but 6 in. of strand 1 is laid in or until 1^a has become 20 ft. long, then cut off 1^a, leaving an end about 6 in. long.

Fourth, unlay strand 4 of the opposite end and follow with strand 4^a, laying it in the open groove as before, treating this as in the first case (see Fig. 3). Pursue the same course with 2^a and 2, stopping 4 ft. short of the first set. Next do this with 5 and 5^a, stopping as before, then with 3^a and 3, and last with 6 and 6^a. The strands are now all laid in with the ends 4 ft. apart, as shown in Fig. 4.

Fifth and last, the ends must be secured without enlarging the diameter of the rope. Take the two rope clamps, as shown in Fig. 6, and fasten them to the rope, as shown in Fig. 5. Twist them in opposite directions, thus opening the lay of the rope, as in Fig. 5. Next with a knife cut out the hemp core about 6 in. on each side. Straighten the ends and slip them into the place occupied by the core; then twist the clamps back, closing up the rope, and take out the slight inequality with the wooden mallet and a block of wood. Next shift the clamps and repeat the operation at the other five places, and the splice is made.

*Logan, W. Va.

Damages for Breach of Coal-Sales Contract

By A. L. H. Street*

Legal phases of the rights of a contract purchaser of coal for resale on the seller's failure to deliver were treated by the Court of Appeals of Kentucky in the late case of Log Mountain Coal Co. vs. White Oak Coal Co., 174 Southwestern Reporter 721.

The plaintiff brought suit to recover the price of installments delivered to the defendant under a contract calling for sale of nut and slack coal deliverable throughout a specified year; and defendant interposed a counterclaim based upon plaintiff's failure to deliver all the fuel called for by the agreement. Judgment having been awarded on the counterclaim, the plaintiff took an appeal to the Court of Appeals, and that tribunal in reversing the judgment decided these points as being applicable to all such contracts:

Damages recoverable for breach of a contract to sell

*Attorney, St. Paul, Minn.

coal intended for resale are measurable by the excess of the market value of the coal, at the time and place fixed in the contract for delivery, above the agreed price. If there is no market for such fuel at the agreed place, the damages are to be assessed with reference to the market value at the nearest available market plus transportation charges.

When the seller knows that the fuel contracted for is intended for resale, his inexcusable failure to make delivery subjects him to liability to the buyer for profits lost on account of being prevented from making the resales. But the Court of Appeals holds that loss of profits cannot be considered as an element of damages recoverable where the buyer makes no effort to obtain fuel elsewhere to take the place of that contracted for, if other coal could reasonably be obtained at a price which would reduce the loss necessarily sustained on account of the breech. But the court holds that the buyer is merely bound to use ordinary diligence to minimize his damages by making purchases elsewhere and is not required to exhaust all *possibility* of buying the desired fuel elsewhere; and that other purchases need not be made when the price of fuel has so advanced that a substitute purchase would enhance the loss.

Steel Mine Timbering Costs

By R. B. Woodworth*

The cost of timbering per ton of coal produced or per linear foot of heading depends on a number of highly variable factors, regardless of whether the timbering is of wood or steel or any other material whatsoever. Chief among these considerations is the first cost of the material itself delivered at the mine or at the working place.

The economic theory which underlies the introduction of steel in substitution for wood in mine timbering is that whatever might be the relative first cost of the two materials delivered at the mines ready for erection, any advantage in the case of wood should be overcome by the durability of steel.

Conservatively estimated on the basis of its low maintenance cost, it is assumed in ordinary calculations that the mine owner and operator can on the average afford to pay about three times as much for his steel mine timbering delivered at the mine as he does for wood, and in the early stages of the substitution of steel for wood it was assumed that the steel would cost about two and one half times as much as a wood installation.

Steel May Be Fitted Exactly to Structural Necessities

Recent practice, however, indicates strongly that in the larger coal mining districts of the United States the difference in cost is not nearly so great, and also that there are other features to be taken into account, such as the small weight of the steel and its greater ease in erection. In some cases it has even been found, where transportation costs are not excessive, that the first cost of the steel timbering erected in place is equal to or but slightly more than the cost of a wooden installation of similar strength. It has also been found that it is possible to fit the steel exactly to the structural necessities, whereas it is impracticable in all cases to do so with wood. This circumstance eliminates an economic waste due to the use, for practical considerations, of larger sized sticks of wood than are really necessary.

*Pittsburgh, Penn.

TABLE 1. RELATIVE COST OF STEEL AND SAWED OAK AND PINE BEAMS DELIVERED UNDERGROUND AND ESTIMATED EXPENSE OF MAINTENANCE FOR 20 YEARS

Steel Beams

Span in Clear, Ft.	Length of Beam, Ft.	Depth in Inches and Shape of Section	Weight in Lb. per Ft.	Weight of Beam, Lb.	Size of Bearing Plates, In.	Weight of Bearing Plates, Lb.	Total Weight of Steel, Lb.	Safe Uniform Load, Lb.	Cost Delivered Underground @ $2 per Cwt.	Estimated Maintenance for 20 Years — Favorable Conditions	Unfavorable Conditions
16	18	10—I	25.0	450	5x½x12	17.0	467.0	16,280	$9.34	Paint 5 times @ $1.00 = $5.00	Paint 20 times @ $1.25 = $25.
12	14	8—I	18.0	252	4x½x12	13.6	265.6	12,640	5.31	Paint 5 times @ .90 = 4.50	Paint 20 times @ 1.15 = 23.
8	10	6—I	12.25	122.5	4x½x12	13.6	136.1	9,680	2.72	Paint 5 times @ .80 = 4.00	Paint 20 times @ 1.05 = 21.
14	16	6—H	23.8	380.8	6x½x12	20.4	401.2	11,460	8.02	Paint 5 times @ .90 = 4.50	Paint 20 times @ 1.15 = 23.
12	14	6—H	23.8	333.2	6x½x12	20.4	353.6	13,370	7.07	Paint 5 times @ .80 = 4.00	Paint 20 times @ 1.05 = 21.
14	16	4—H	13.6	217.6	4x½x12	13.6	231.2	4,070	4.62	Paint 5 times @ .85 = 4.25	Paint 20 times @ 1.10 = 22.
12	14	4—H	13.6	190.4	4x½x12	13.6	204.0	4,750	4.08	Paint 5 times @ .75 = 3.75	Paint 20 times @ 1.00 = 20.

Square Sawed White Oak Beams

Span in Clear, Ft.	Length of Beam, Ft.	Size of Beam, In.	Weight of Beam, Lb.	Feet, Board Measure	Safe Uniform Load, Lb.	Cost Delivered Underground @ $40. per M.	Estimated Maintenance for 20 Years — Favorable Conditions		Unfavorable Conditions	
16	18	11x14	885	231	16,470	$9.24	Renew 2 times $18.48 Labor $5.00 10.00	$28.48	Renew 6 times $55.44 Labor $5.00 30.00	$85.44
12	14	9x12	483	126	13,200	5.04	Renew 2 times 10.08 Labor 4.50 9.00	19.08	Renew 6 times 30.24 Labor 4.50 27.00	57.24
8	10	6x10	192	50	9,170	2.00	Renew 2 times 4.00 Labor 4.00 8.00	12.00	Renew 6 times 12.00 Labor 4.00 24.00	36.00
14	16	9x12	552	144	11,310	5.76	Renew 2 times 11.52 Labor 4.50 9.00	20.52	Renew 6 times 34.56 Labor 4.50 27.00	61.56
12	14	9x12	483	126	13,200	5.04	Renew 2 times 10.08 Labor 4.50 9.00	19.08	Renew 6 times 30.24 Labor 5.50 27.00	57.24
14	16	8x8	327	85	4,470	3.40	Renew 2 times 6.80 Labor 4.00 8.00	14.80	Renew 6 times 20.40 Labor 4.00 24.00	44.40
12	14	8x8	286	75	5,210	3.00	Renew 2 times 6.00 Labor 4.00 8.00	14.00	Renew 6 times 18.00 Labor 4.00 24.00	42.00

Square Sawed Beams. Longleaf Yellow Pine

16	18	9x14	693	189	15,920	$7.56	Renew 2 times $15.12 Labor $5.00 10.00	$25.12	Renew 6 times $45.36 Labor $5.00 30.00	$75.36
12	14	10x10	428	117	12,040	4.68	Renew 2 times 9.36 Labor 4.50 9.00	18.36	Renew 6 times 28.08 Labor 4.50 27.00	55.08
8	10	8x8	195	53	9,240	2.12	Renew 2 times 4.24 Labor 4.00 8.00	12.24	Renew 6 times 12.72 Labor 4.00 24.00	36.72
14	16	8x12	469	128	11,890	5.12	Renew 2 times 10.24 Labor 4.50 9.00	19.24	Renew 6 times 30.72 Labor 4.50 27.00	57.72
12	14	8x12	411	112	13,860	4.48	Renew 2 times 8.96 Labor 4.50 9.00	17.96	Renew 6 times 26.88 Labor 4.50 27.00	53.88
14	16	6x8	235	64	3,960	2.56	Renew 2 times 5.12 Labor 4.00 8.00	13.12	Renew 6 times 15.36 Labor 4.00 24.00	39.36
12	14	6x8	205	56	4,620	2.24	Renew 2 times 4.48 Labor 4.00 8.00	12.48	Renew 6 times 13.44 Labor 4 00 24.00	37.44

Figures based on bending stresses of 1100 lb. per sq.in. for white oak and 1300 lb. per sq.in. for longleaf yellow pine and 16,000 lb. per sq.in. for steel. Loads to be uniformly distributed over length of span.

AN ACCEPTABLE AND SATISFACTORY TYPE OF STEEL TIMBERING OVER A SIDETRACK

Table 1 was prepared by a mining company in western Illinois and compares the relative cost of steel beam collars, square-sawed white oak beams and square-sawed yellow-pine beams delivered underground. It also estimates the comparative maintenance costs for a period of 20 years, based on the most favorable and the least favorable probable conditions. The safe working loads are based on the currently accepted values for the materials under bending stress.

TABLE 2. FIRST COST AND COST AT END OF 20 YEARS OF STEEL AND SAWED OAK AND PINE BEAMS

Span in Clear, Ft.	Steel			White Oak			Longleaf Yellow Pine		
		20-Year Cost			20-Year Cost			20-Year Cost	
	First Cost	Favorable Conditions	Unfavorable Conditions	First Cost	Favorable Conditions	Unfavorable Conditions	First Cost	Favorable Conditions	Unfavorable Conditions
16	$9.34	$14.34	$34.34	$9.24	$37.72	$94.68	$7.56	$32.68	$82.92
12	5.31	9.81	28.31	5.04	24.12	62.28	4.68	23.04	59.76
8	2.72	6.72	23.72	2.00	14.00	38.00	2.12	14.36	38.84
14	8.02	12.52	31.02	5.76	26.28	67.32	5.12	24.36	62.84
12	7.07	11.07	28.07	5.04	24.12	62.28	4.48	22.44	58.36
14	4.62	8.87	26.62	3.40	18.20	47.80	2.56	15.68	41.92
12	4.08	7.83	24.08	3.00	17.00	45.00	2.24	14.72	39.68

Table 2 states the first cost of such beams and their cost at the end of the 20-year period under the conditions assumed. It, therefore, represents what might be called a reasonable expectation of relative service in a particular district where the conditions as to transportation, cost of steel and the relative availability of wood are normal.

Examination of Table 2 will indicate that in the case of the 16-ft. spans there is but little difference in the first cost between steel and white oak, and that at the end of 20 years under any circumstance steel is the most economical.

This economical advantage of steel as compared with wood would be somewhat enhanced if consideration were had to the matter of interest on the investment, which, however, the mining company which prepared the table did not consider. It can also be said that repainting of steel once in 4 years is about the limit of probability. The writer knows of installations that have been in place two and three times as long as that without repainting, and it must not be forgotten that, except in special locations, conditions underground as regards paint are much better than they are above ground.

Carbide Lamps Constructed of Copper should never be used because such lamps are liable to explode. The Bureau of Mines recommends that the spent lime be placed in a dry, metallic can, having a lid with a vent, so that the waste material can be taken out of the mine at the end of the shift.

Calculation of Mine Gangway Timbers

By A. G. Morlock*

SYNOPSIS—Physical conditions affecting the size of timbers required in a mine are variable, and experience must largely govern this determination. There are, however, fixed principles relating to the strength of beams and posts that give valuable assistance in ascertaining what sizes of different kinds of timber or steel are adapted to give the necessary support to the roof in mine workings.

There seem to be no definite rules by which the size of mine-gangway timbers may be calculated. Experience largely governs their use and, as both experience and judgment differ widely, in many cases the timbers are either too small or too large for the work required of them. The compressive stress of timbers—wood or steel—is often neglected, resulting in economic waste.

Owing to the adjustment of stresses underground, it is impossible to calculate the loading of the timbers with mathematical accuracy; however, rules may be formulated that will give approximate results. The experienced miner knows the size of collar best adapted for certain conditions in the gangway, so that by taking an average of the strength of collars used in several different gangways we arrive at a value that may be used in calculating other gangway timbers.

Where the strata are horizontal or the dip is light the loads are applied normal to the collar, and produce therein bending stresses, while compressive stresses result in the legs, each leg taking one-half of the total load on the collar.

Where the dip of the strata is great, however, legs and collars may be subject to both bending and compressive stresses at the same time. The compressive stresses in the collars may safely be ignored, as they are taken care of in the average bending load that a collar will support, but the legs must be calculated for both bending and compression. This bending load per foot of length I will assume as being equal to that applied to the collar.

When the diameter and length of an existing collar are known the safe load per foot of length that it will support may be calculated by the formula

$$w = 0.065\, f \frac{d^3}{l^2} \qquad (1)$$

in which

w = Safe load per foot of length of span (lb.);
d = Least diameter of collar (in.);
l = Length of clear span (ft.);
f = Safe unit fiber stress (1,200 lb. per sq.in. of section, for long-leaf yellow pine and white oak, and 900 lb. per sq.in., for short-leaf yellow pine).

In calculating legs for compressive stresses only, the formula

$$f_c = \frac{L\,(700 + 15\,c + c^2)}{a\,(700 + 15\,c)} \qquad (2)$$

should be used, in which

L = Total load on leg (lb.);
a = Area of cross-section of leg (sq.in.);
c = Length of leg in inches, divided by its least diameter in inches.

The diameter of the leg must be assumed for trial, the most economical section being that in which the safe unit fiber stress is not exceeded.

Practical Examples

The following practical examples will show the correct method of using these formulas.

Example 1—What size legs would be required for a long-leaf yellow-pine timber set in a gangway 12 ft. wide, with clear headroom of 8 ft.; the strata being horizontal? Assume 2,000 lb. per lineal foot for load on collar.

Solution—2,000 × 12 = 24,000 lb., total load on collar, and 24,000 ÷ 2 = 12,000 lb., total load on each leg.

Assuming the least diameter of the leg to be 4⅜ in., the area of section is $0.7854\ (4\frac{3}{8})^2 = 15.03$ sq.in.; and $c = 8 \times 12 \div 4\frac{3}{8} = 21.94$, which substituted in Formula 2 gives for the compressive stress in the leg,

$$f_c = \frac{12{,}000\,(700 + 15 \times 21.94 + 21.94^2)}{15.03\,(700 + 15 \times 21.94)} = 1{,}172 \text{ lb. per sq.in.}$$

Since 1,172 lb. is less than the unit stress for long-leaf yellow pine (1,200 lb.), a 4⅜-in. stick will support the load; however, in this case, it would be advisable to use a larger stick, say 8 in. diameter, to allow for defects in the wood and unforeseen bending stresses.

Example 2—Design a long-leaf yellow-pine timber set for a gangway 12 ft. wide, with a clear headroom of 8 ft., the strata having a dip of 45 deg. The writer has found 2,000 lb. per lineal foot of collar to be the average load in his locality where the dip of the strata is very heavy; so we will assume this value in solving the problem.

Solution—Reversing Formula 1, so as to give the value of d and substituting the values given for the load per lineal foot of collar, unit fiber stress and length of span, we have

$$d = \sqrt[3]{\frac{w l^2}{0.065\, f}} = \sqrt[3]{\frac{2{,}000 \times 12^2}{0.065 \times 1{,}200}} = 15.45, \text{ say } 15\tfrac{1}{2} \text{ in.}$$

The load producing compression in each leg is 24,000 ÷ 2 = 12,000 lb. Assuming as before the same bending load for the leg, as for the collar 2,000 × 8 = 16,000 lb. bending load on each leg. Then, assuming 12½ in. as the least diameter of leg and solving for the allowable unit stress due to compression, we have by Formula 2, since $c = 8 \times 12 \div 12\frac{1}{2} = 7.68$.

$$\frac{L}{a} = \frac{f\,(700 + 15\,c)}{700 + 15\,c + c^2} = \frac{1{,}200\,(700 + 15 \times 7.68)}{700 + 15 \times 7.68 + 7.68^2} = 1{,}118.4 \text{ lb. per sq.in.}$$

The unit stress due to bending, for a total load of 16,000 lb., as found above, is calculated by solving Formula 1 for f; thus,

$$f = \frac{w l^2}{0.065\, d^3} = \frac{2{,}000 \times 8^2}{0.065 \times 12.5^3} = 1{,}008.2 \text{ lb. per sq.in.}$$

*Lansford, Penn.

The unit stress due to compression is

$$f_c = \frac{L}{0.7854\,d^2} = \frac{12{,}000}{0.7854 \times 12.5^2} = 97.8\ lb.$$

The total stress in the leg due to bending and compression is therefore

$$1{,}008.2 + 97.8 = 1{,}106\ lb.\ per\ sq.in.$$

As the unit stress produced by the loads is thus shown to be nearly equal to but less than the allowable unit stress, a 12½-in. stick is the most economical section to use.

The Use of the Section Modulus

When calculating beams of special cross-section, as steel I-beams, it is customary to employ an expression called the "section modulus" of the beam. The section modulus (S) of a beam is a value that multiplied by the unit fiber stress (f) of the material gives the bending moment (M) of which such beam is capable of supporting, as expressed by the formula

$$M = fS \qquad (3)$$

But, for a beam uniformly loaded and supported at each end, the bending moment (M), in inch-pounds, is

$$M = \frac{12\,wl^2}{8} = 1.5\,wl^2 \qquad (4)$$

Combining equations 3 and 4 gives for the section modulus

$$S = 1.5\frac{wl^2}{f} \qquad (5)$$

Example 3—Design a steel timber set for a gangway 12 ft. wide, with a clear headroom of 8 ft., the strata having a heavy dip, assuming a fiber stress for steel, f = 16,000 lb. per sq.in.

Solution—The average load per lineal foot on the collar being assumed, as before, w = 2,000 lb. and the span being l = 12 ft., the required section modulus, in this case, is

$$S = 1.5\frac{wl^2}{f} = \frac{1.5 \times 2{,}000 \times 12^2}{16{,}000} = 27$$

Any one of the following sections, taken from steel manufacturers' handbooks, will be satisfactory: 8-in.-32.5-lb. Bethlehem girder beam, section modulus, 28.6; 8-in.-32-lb. Bethlehem H-column, section modulus 26.9; 10-in.-30-lb. standard I-beam, section modulus, 26.8. A 10-in.-30-lb. I-beam is the most economical section, but an H-beam, or girder beam, is to be preferred as it has a broader bearing surface.

Assuming the leg to be a 10-in.-25-lb. I-beam, which has an area a = 7.37 sq.in.; radius of gyration, r = 0.97; and section modulus, S = 24.4; using Gordon's formula for medium steel, fixed-end column and solving for ultimate strength (P), we have

$$P = \frac{50{,}000}{1 + \frac{(12\,L)^2}{36{,}000\,r^2}} = \frac{50{,}000}{1 + \frac{(12 \times 8)^2}{36{,}000 \times 0.97^2}} = 39{,}308\ lb.$$

With a safety factor of 4, the safe unit stress is $\frac{39{,}308}{4}$ = 9,827 lb.

Again, assuming the same unit bending load for the leg as for the collar, w = 2,000 lb. per lineal foot, and the length of the leg being l = 8 ft. the bending moment, applying Formula 4, is

$$M = 1.5\,wl^2 = 1.5 \times 2{,}000 \times 8^2 = 192{,}000\ in.\text{-}lb.$$

This makes the unit fiber stress due to bending

$$f = \frac{M}{S} = \frac{192{,}000}{24.4} = 7{,}869\ lb.\ per\ sq.in.$$

The unit stress due to compression, for a 12-ft. span, the sectional area of the leg being a = 7.37 sq.in. is

$$f_c = \frac{L}{a} = \frac{2{,}000 \times 12}{2 \times 7.37} = 1{,}628\ lb.\ per\ sq.in.,$$

which makes the total unit stress due to bending and compression

$$7{,}869 + 1{,}628 = 9{,}497\ lb.\ per\ sq.in.$$

This actual stress in the leg is less than the safe stress, therefore a 10-in.-25-lb. I-beam will satisfy the conditions assumed in this case.

German Post-Pulling Device

A German device which may be termed a post puller, although it differs from what is commonly understood in the United States by that name, is shown in the accompanying illustration. It is described in *Glückauf* by "Mining Assessor" Doctor Beissel, of Aachen.

The device constitutes essentially a joint or hinge in the post which may be released by pulling a rope, thus allowing the post to be buckled and brought down. The post is cut obliquely into two segments, so that it tends to slide

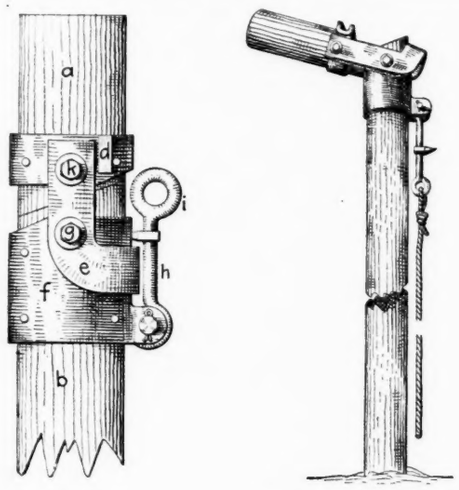


Fig. 1 Fig. 2

DETAILS AND OPERATION OF POST PULLER

apart under the rock pressure. The sliding action is resisted by friction and also by the mechanical joint. When the latter is loosened, the pulling apart of the post is an easy matter.

In Fig. 1, a and b are the segments of the sawed post. The piece a carries a collar with lugs d. Against these rests a bell-crank lever e, which is pivoted at g to the collar f around the lower segment of the post. The hook or latch h with the rope eyelet i is pivoted at the bottom of the ring and carries a point which is driven into the post through a hole in the ring above the lower part of the lever e, thus holding this lever in position.

Thus when the latch h is pulled outward by the rope, the lever e is released. The lever e is loosely pivoted to the upper collar by the pin k to keep the upper and lower portions of the device from dropping apart when relaxed.

The post is pulled by a rope in the eyelet i. This releases the lever e, which turns on its pivot, relieves the

pressure against the lugs *d* and permits the upper part of the post to slide off the lower.

These pullers have been given a long trial in seams about 7 ft. thick pitching 45 deg. They are put on the posts aboveground so that setting the timber in the mine takes only the usual time. In order to allow the proper amount of friction at the joint, a post of 4-in. diameter should be sawed at 30 deg. and one of 7¼-in. at 38 deg. For various practical reasons it is better to make the joint near the top of the post.

Numerous advantages are claimed for this device. It is patented and its manufacture is in the hands of the Eschweiler Bergwerks-Verein, Eschweileraue, Germany.

Extracts from a Superintendent's Diary

After being driven almost to desperation by repeated failure to devise a satisfactory dockage system, I believe I have hit upon a scheme at last that will fill the bill.

Reviewing the various dockage schemes that we have tried at different times, I became impressed with the fact that in none of them had we made an attempt to reward miners who were doing satisfactory work or even to show them that we appreciated their efforts. I recalled that in all lines of industry prizes and bonuses have become recognized as valuable aids, and I could think of no good reason why miner folk should not be susceptible to the same influences as other laboring men.

With that thought as a starting point, I worked up the plan which I have just put into effect.

I had in mind two things—first, recognition of good work, and then a suitable reward.

We have several foremen whose duty it is to wander about in the mines, keeping tab on the loaders to see that they load clean coal. These men are to be replaced with honor men chosen from the ranks of the miners. At the close of each two weeks' period we will select men who have made the best records for clean coal as shown by our slate reports during that period, and they will act as loading inspectors, showing the others just how the loading should be done; because of their record they can speak with authority. For this work we will pay them a rate twice as large as they earned as miners during the previous two weeks. They are thus granted recognition and suitable reward.

But we will not let the reward rest with that. We wanted to arrange the reward so that all of the men could profit by the improvement, and to accomplish this end we will divide with the men any increase in the value of our coal because of its better quality. In our case this is very easily determined. All of our small sizes have to be handled through a washer, and the washer loss is dependent entirely upon the amount of slate that the miner loads with his coal. If the records show that we have reduced the washer loss 200 tons during a two weeks' period, we will credit the men with one-half, or 100 tons, as a bonus, valuing it as washed coal.

Taking the average for the last 12 months, we found that the washer loss was 10 per cent. of the total tonnage handled by the washer, and we are to use that as the basis for determining how much improvement has been made.

I had a hard time getting our general manager to consent to a trial of the plan, as he was afraid of the precedent that might be established. Our local union committee finally agreed, however, that we might adopt the plan and let it remain in force during the unexpired term of our present contract, and then withdraw it entirely if we desired. They were largely governed by the fact that we were really not making a change in the contract price. This made it easier for our manager to give his consent.

According to my prediction, the quality of our coal will improve to a noticeable extent during the first few months and then reach a standard that will be hard to improve upon. The men will have learned by that time to live up to their increased income, and we will be able to supply the increased income by increasing the digging price in return for more liberal dockage rules; this will automatically rid us of all undesirables.

Rapid Increase in Automobile Coal Trucks

As indicating the rapid change being made in the type of delivery equipment in use by the retail dealers, the credit departments of the various shippers report numerous inquiries from automobile concerns as to the standing of some of their customers. It is really remarkable in some of the larger cities to note the rapid increase in the use of automobiles for coal delivery. New trucks are seen on the streets almost hourly. Practically all of the wholesale houses, too, have outfitted their salesmen with runabouts.

An Injunction Is Dissolved

By a decree of Judge Moser, of Sunbury, the preliminary injunction secured by the Kingston Coal Co. to restrain the Plymouth Coal Co. from stopping its fans and pumps at the abandoned Dodson colliery at Plymouth has been dissolved at the cost of the plaintiff. An opinion in the case is soon to follow.

Several months ago, after injunctions were secured by Plymouth Borough to restrain the Plymouth Coal Co. from further mining in order to safeguard the borough against a serious subsidence of the surface, the Plymouth Coal Co. abandoned its Dodson colliery. The Kingston Coal Co., which operates the Gaylord colliery adjoining, then secured a preliminary injunction to restrain the Plymouth Coal Co. from removing its pumps and stopping its fans, on the ground that water and gas would enter the Gaylord colliery through openings in a barrier pillar.

The Plymouth Coal Co. denied liability and responsibility for keeping its fans and pumps in operation after being compelled to abandon its colliery. The cost of running fans and pumps and the responsibility for cutting through the barrier pillar also entered into the case. The injunction was heard before Judge Moser, and after final hearing and arguments, the court directs that the preliminary injunction awarded Mar. 29, 1915, be dissolved.

Railway Coal-Storage Plants

In our issue of Oct. 16, 1915, we republished an article entitled "Railway Coal-Storage Plants" from the pages of a contemporary. Roberts & Schaefer Co., of Chicago, write us saying that the coal-station machinery referred to on page 626 was not furnished by the Ogle Construction Co. as stated, but by the Roberts & Schaefer Co. The cranes were built as stated by the Link-Belt Co.

A Few "Dont's" for Motormen

By James Thomas Reynolds*

The unusual possibilities of danger to the life and limb of not only the young men who generally operate the motors underground, but through any careless act of theirs to every employee in the mine at times, are only too obvious to anyone whose work takes him into one mine, let alone many. These pernicious opportunities for man-injury and equipment-destruction are glaringly plentiful to those who have reason to look over many different mines in many different states.

A man whose work lies in one mine may see much he would have otherwise—motors run deliberately without regard to safety of costly material or even the lives of the motormen and snappers themselves. In traveling from one mine to another one sees so much done that should not be done, so much omitted that ought not to be omitted and so much faulty operation through bad mining conditions as well as bad practices on the part of the operatives that the wonder is, not that so many lives are lost through this cause or causes and so many men are injured, but that the result is not worse.

The intent of the following suggestions, however, is not to fully cover this entire subject, which of course takes in not only the carelessness incidental to the men themselves whose duty is to run the underground motors, but the conditions of the roadways, tracks, etc., over which they are compelled to operate. These conditions vary as the mines themselves vary—more's the pity! Uniformity of action and care is fortunately possible to the personnel, and it is directly to the latter that I address a few "dont's" which may easily be memorized by the motorman and helper who have a tendency to thoughtlessness while working.

Trusting these may be the indirect means somewhere of saving a life or saving someone from injury, I append them as jotted down in my notebook, without effort at logical sequence:

Don't forget that safety is your first consideration.

Don't allow anyone except those authorized by the mine foreman to ride on your trip or motor. Injury or death may result therefrom, in which case remember that YOU would be held responsible.

Don't leave your trip where it will obstruct the passage of air if this can possibly be avoided (and it generally can by a little more care and effort), and don't open a door to pass your trip through without closing it; for, failing in either of these precautions, you may, particularly if the mine is gassy, cause by such apparently trivial action your own death as well as that of all in the mine.

Don't hurry to gain five minutes and by so doing lose an hour; it's a poor "gain" on the cost sheet.

Don't use abusive language to the foreign miners who at first fail to understand you. Without the miner there is neither work nor pay for the motorman. Remember that if they can't speak your language you have nothing on them in that; it is 10 to 1 that you cannot speak theirs.

Don't allow your trip to get beyond control, but if this contingency arises, keep a cool head. This sometimes plays a great part in getting out of a bad mess with a whole hide.

Don't allow any unauthorized person to handle the controlling parts of your motor; accidents and loss of life have sometimes resulted from the motorman's indifference to this precaution.

Don't fail to report any bad track immediately to the proper roadman, and if this fails of result, to the foreman. Remember, a penny spike in time may save the company a costly motor and you your health or life itself.

Don't get reckless and "pull her wide open" when matters don't seem to be going smoothly. The greatest day's run isn't always to the daredevil motorman's credit; he's too apt to get into a smashup just when he thinks he has the record clinched. Moreover, it is better for the company and you to go steady and be safe a thousand times than fast and injured once.

Don't forget to oil your motor when required.

Don't pull cars back over frogs and through switches to replace them on the track. You are not putting yourself in good standing with the company or the foreman by saving ten minutes' time and destroying $10 worth of cars, motor and roadway. The firm has supplied you with climbers with which to replace cars.

Don't forget that the motor boss is paid by the company to give you orders. These may not always be to your liking, but remember he's paid to command and you to obey, and it's useless to take your "revenge" by leaving the trip standing and quitting without notice, thinking the plant will have to shut down. It won't. I know, because I've tried it.

And when you think you must take an unnecessary chance with your life, even if you forget yourself, don't fail to remember those at home.

*Mine-safety inspector, Aetna Life Insurance Co., Houston, Penn.

Cause Unknown

By R. T. Strohm

THE miner, as he left his job,
Cleaned out his soothing brier;
The ashes fell among the gob
And set the stuff afire.
The owners wagged their heads—and jaws;
They spouted threat and fustian;
And then announced that ancient cause,
"Spontaneous combustion."

He left some carbide when he quit,
The rules of safety spurning;
The moisture soon got into it
And started things to burning.
They sought the cause with might and main,
By quizzing and inspection,
But all their striving was in vain;
It still escaped detection.

A timber for his mine lamp made
A rather handy holder,
Until the flame, by currents swayed,
Had set the wood a-smolder;
And though the inquiry brought out
A world of elocution,
The problem still was left in doubt;
It quite defied solution.

He threw a wornout wick aside,
All thought of risk disclaiming;
It fell on timber old and dried,
And later set it flaming.
From lip to ear wild guesses sped,
And theories flew faster,
But this is what the verdict read:
"*Mysterious disaster.*"

Barometric Condenser Drain

By H. R. Bissell*

SYNOPSIS—A practical method of draining a water pocket in piping carrying steam under 28 in. of vacuum is here described.

Fig. 1 shows the 24-in. exhaust piping from a 500-kw. turbine to the surface condenser installed at the central power station of the Century Coal Co., at Century, W. Va. This condenser operates under 28-in. vacuum referred to a 30-in. barometer, or practically 1 lb. absolute pressure.

The turbine exhausts downward, and the steam, after passing through the gate valve, must rise about 10 ft. to the inlet of the condenser. Water collects in the lower part of this 24-in. line owing to two causes—first, there is a partial condensation of the exhaust steam before reaching the condenser, and second, at this plant the steam is at times very wet and occasionally even slugs of water come over from the boilers. These of course collect in the 24-in. line after passing through the turbine.

While without question some of this water is carried up into the condenser by the high velocity of the exhaust steam, still a safe and satisfactory operation of the turbine required some method of removing this water promptly and automatically. As originally installed there was a 2-in. drip line from the lowest part of the 24-in. pipe to a small pump and hotwell, a float in the latter actuating the steam-inlet valve to the pump.

This arrangement was not satisfactory because of the fact that local conditions prevented the pump being placed at such a depth as would give the inlet water to the pump sufficient head for the automatic controlling of the pump at variable speeds by the float in the hotwell. This was an important point in order to take care of slugs of water coming over from the boilers.

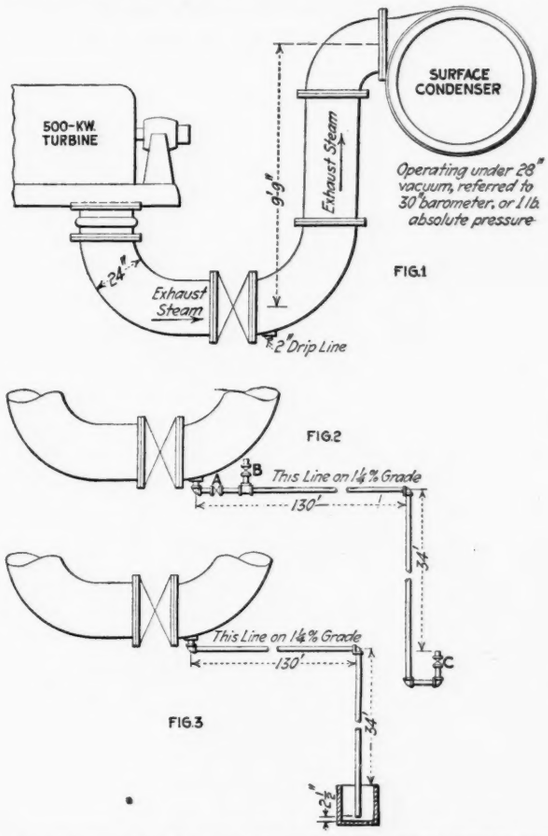
To make this point clearer, the float would control the pump when the condensate was collecting in small quantities; but with a sudden increase in the condensate, the float would open wide the steam-inlet valve, and with the low head of water there would not be sufficient pressure to force the water into the pump at its increased speed, causing it to race. It was therefore necessary to throttle down the pump to make it operate, and under such condition it would not automatically remove sudden increases in the condensate.

It should be borne in mind that the problem was to remove water from the 24-in. line which was under 28-in. vacuum and that, instead of 14.7 lb. atmospheric pressure to force water into the pump, there was a maximum of 1-lb. pressure, depending of course upon the condition of the pump.

The Original Plan Included Three Valves

The original theoretical plan for removing the water by a barometric drain is shown in Fig. 2. A 2-in. pipe line with three valves was run from the 24-in. exhaust to the hoisting shaft of the mine, a distance of 130 ft., with a minimum downgrade of 1¼ per cent., then down the shaft 34 ft. and turned upward. For convenience the barometer can be considered as being 30 in. and the vacuum in the condenser as 28 in., inasmuch as any change in the barometer is accompanied by a corresponding change in the absolute pressure of the condenser.

The proposed operation was as follows: Suppose valves *A*, *B* and *C* to be closed and the line included between them to be full of water. Upon opening valve *C*, the water would run down and out until it left a column 34 ft. high, balanced by atmospheric pressure. Above the water there would be a practical vacuum. Next suppose the condenser to be brought up to 28-in. vacuum, or 1-lb. absolute pressure. Should valve *A* now be opened, there would be 1-lb. pressure, forcing the water toward the shaft; and this pressure being sufficient to lift water 2 ft., the proposition would work theoretically if the 2-in. line rose 2 ft. instead of slanting downward this amount. However, the line being entirely downgrade, the 1-lb. pressure would lower the barometric column to 32 ft., and as water entered above, a corresponding amount would overflow at the bottom to maintain that height of column.



ARRANGEMENT OF DRAIN ON TURBINE EXHAUST PIPING

When ready to shut down, valve *A* should be closed, after which the condenser could be stopped and the column of water would be left suspended in the mine shaft overnight. The purpose of the valve *B* was to prime the line after closing the valve *C*, in the event of the water column being lost while the turbine was idle, by air leaking through the valve *A*.

*Mining engineer, Century, W. Va.

This proposition depended upon air-tight valves, and there is no question but that the more practical plan is as shown in Fig. 3. This has been successfully installed and is far more efficient, and in addition is entirely automatic.

As noted in Fig. 3 a line similar to that shown in Fig. 2 was laid, except that there are no valves and the lower end of the 2-in. line extends down into a wooden tank, 15x15 in. and 16½ in. deep, affording ample capacity for water to seal the end of the drip line at all times.

Absolutely no attention to this line is required. When the condenser is started, atmospheric pressure forces water up the column a distance of 13.6 times the inches of vacuum in the condenser (for 28 in., 31.7 ft.), and an interesting test can be made by checking the amount of water displaced in the tank with the volume of water figured to be in the column. Since the absolute pressure in the 2-in. line above the water column is the same as in the condenser and since water will seek its level, whether under 100-lb. pressure, atmospheric pressure or under vacuum, as condensation collects in the 24-in. turbine exhaust it runs down the 2-in. line to the water column in the shaft, and a corresponding amount overflows the tank, so that the barometric column maintains the same height, according to the barometer and the degree of vacuum maintained in the condenser.

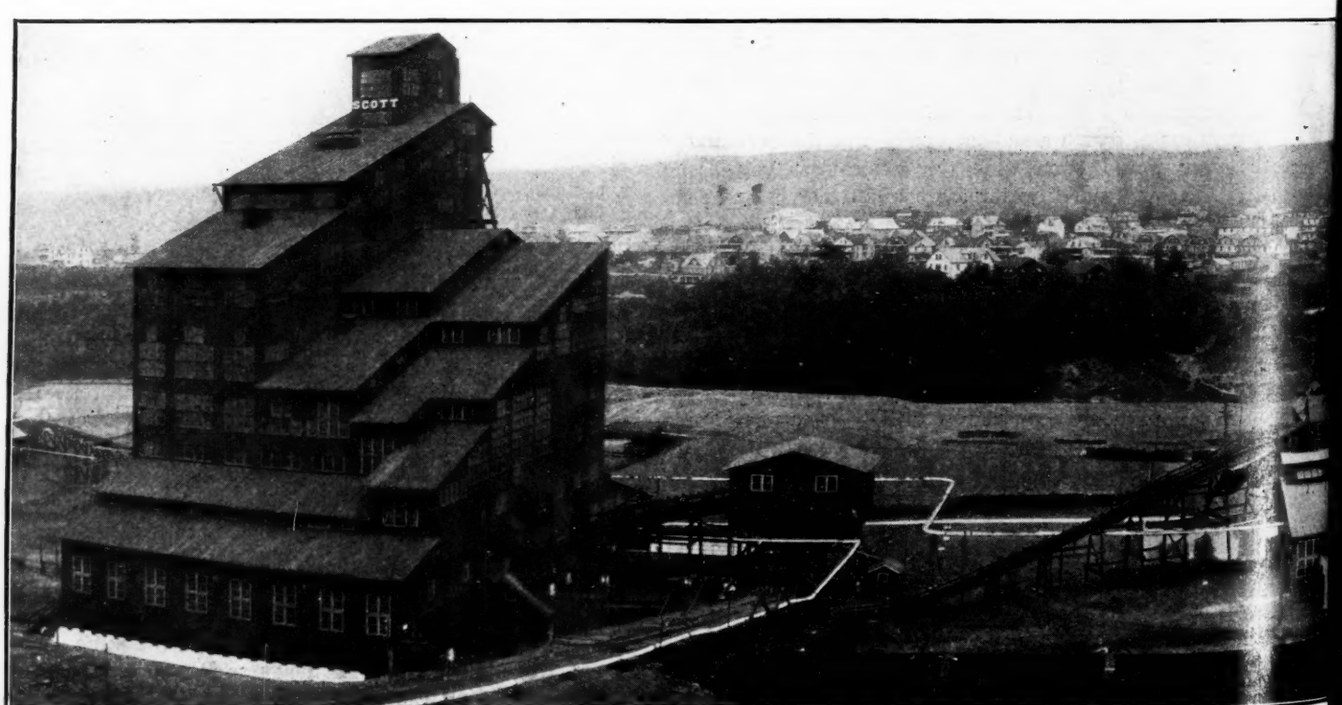
It will be noted in Fig. 3 that the 2-in. drip line extends within 2½ in. of the bottom of the wooden tank. What would be the result should the level of the water in the tank for any reason recede below the bottom of the 2-in. drip line while the condenser is in operation? While it is well known that atmospheric pressure will not lift water higher than as already explained, still the column of water in such a case will be carried up into the 24-in. line by the velocity of the air going up through the 2-in. pipe. As the top of the water column is approached, the pressure existing therein decreases and the speed at which this column is carried upward by the air gradually rises, as the air after entering at the lower end reaches points of lower pressure and expands, until all the water in the column has been discharged into the 24-in. pipe.

An additional point which I wish to bring out is that by a "whirlpool" effect the entire 2½ in. of water in the tank below the column has been swept up the 2-in. line by the velocity of the air being forced up this pipe. The vacuum in the condenser was of course destroyed.

Canary Is Not a Safe Test of Deoxygenated Air

The resistiveness of a canary bird to oxygen deficiency has been demonstrated during two explorations of a mine-fire area by the apparatus crew of the Bureau of Mines from the Pittsburgh station. Duplicate air samples that were collected during the first exploration at a point 1,000 ft. from the fresh-air base showed on analysis only 6 and 7 per cent. oxygen respectively, yet the canary bird was apparently not affected. The safety lamps were extinguished, however, before the apparatus crew advanced to the point where these samples were collected.

On the second exploration, to a point 2,000 ft. from the fresh-air base, one air sample showed only 2 per cent. oxygen, and the canary was of course overcome long before this point was reached. However, the bird was carried back at once to the point where the analysis had shown 7 per cent. oxygen, and when the apparatus party returned in 20 min. they were surprised to find that the canary had revived in that atmosphere. All the analyses were made with an Orsat apparatus at the fresh-air



SCOTT COLLIERY OF THE SUSQUEHANNA COAL CO. AT SHAMOKIN, PENN. THE BOILER HOUSE IS EQUIPPED

base inside the mine. The atmosphere contained practically no carbon monoxide, as the analyses show:

	Sample No. 1	Sample No. 2
Carbon dioxide, CO_2	2.6%	2.5%
Oxygen, O_2	7.4%	6.0%
Carbon monoxide, CO	trace	trace
Methane, CH_4	14.6%	16.8%

This fire area had been sealed off for 11 months. The apparatus explorations showed that no fire existed, and the mine was successfully reopened. This demonstration of the ability of the canary bird to live in an atmosphere so low in oxygen as to be fatal to human life is most important. It demonstrates that it is absolutely needful to *carry a safety lamp to test for oxygen deficiency.* The canary may be used to indicate the presence of carbon monoxide, but that is all. Every rescueman must keep this in mind and not say that "I am willing to go anywhere where the canary survives."

Use of Liquid Air for Blasting by a New Process*

The first experiment with liquid air as an explosive dates back nearly to the beginning of its industrial production. Professor von Linde made an explosive called "Oxyliquit" by mixing liquid air with charcoal. This explosive broth, or paste, was put directly into the drill hole and fired by means of cartridges and fuses.

Since this primitive method gave unsatisfactory results, it was modified by filling a suitably prepared cardboard cylinder with an explosive substance, preferably by dipping the whole in liquid air. This method gave results, but was lacking in safety and depended on the skill of the workmen and quickness of manipulation. The trouble was due largely to the enormous difference in temperature between the liquid air and the surrounding rock, so that the air rapidly evaporated in the hole. The maximum theoretical life of a blasting cartridge was thus only 10 min., while in practice it was still shorter.

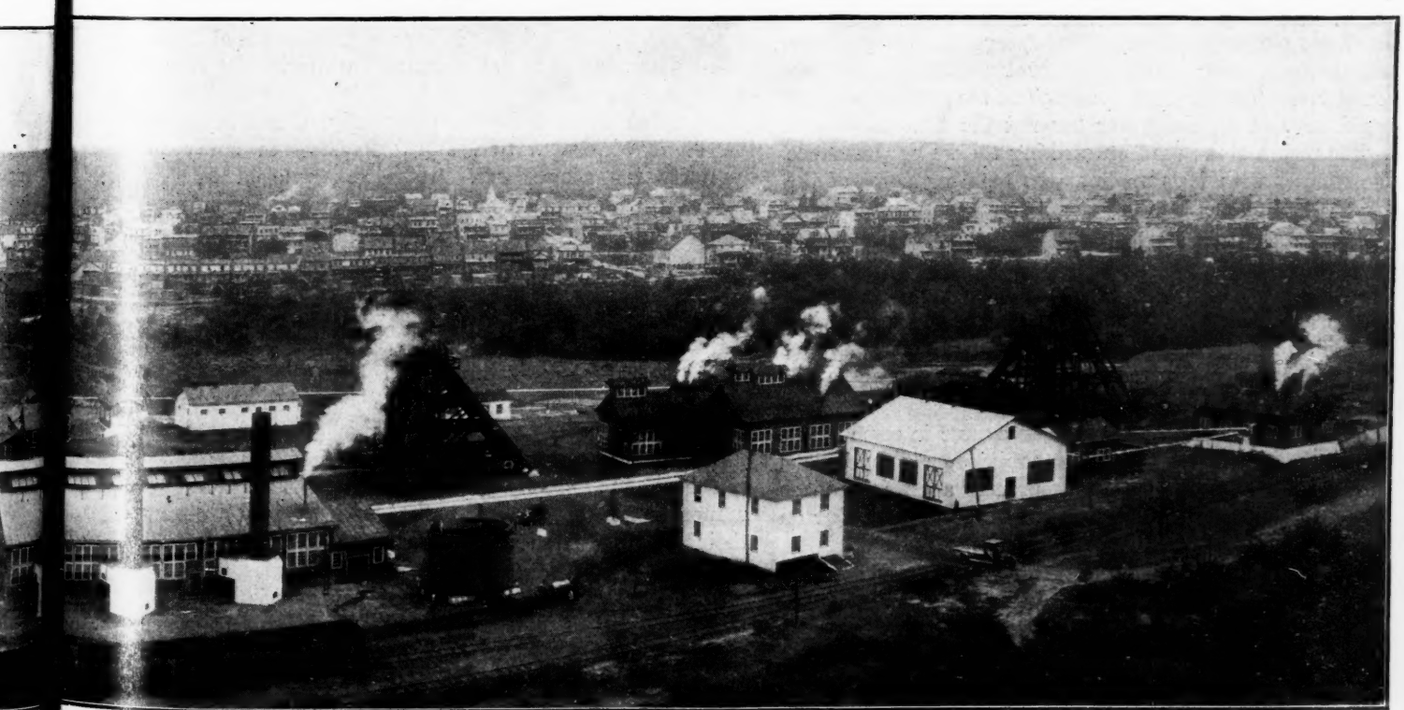
Interesting experiments have been made in France by Georges Claude, and other experiments which improve upon the von Linde method have been conducted in Charlottenburg, Germany, by Kowatsch, with the coöperation of von Baldus.

In order to prevent a rapid evaporation of the liquid air, Kowatsch puts the cartridge with the dry carbon container in the drill hole before introducing the liquid air and avoids the dangerous loss of time by necessary preparations, such as tamping the hole after the mixture has been made. The liquid air is not introduced until time for shotfiring. This reduces the evaporation period to a minimum.

The cardboard cylinder contains a perforated partition tube in which is placed a perfectly innocuous mixture of infusorial earth and oil or asphalt, or of soot and paraffin. The central partition tube incloses a cardboard tube, over which is thrust another cardboard tube to serve for carrying off the evaporation product of the liquid air. If several holes are to be fired at once, the electric wires are connected.

The liquid air intended for each hole is provided in a suitable quantity in a small flask to the opening of which is attached a metal tube with a conical point, into which tube is introduced the central tube of the cartridge. To charge the cartridge, it suffices to raise the back end of the flask. The liquid air is then lifted by pressure of its evaporation products (just as water containing gas is lifted by pressure of carbonic acid) in the metal tube and is forced into the cartridge. At the moment when the shot is fired by an electric fuse, the liquid air combines with the components of the charge and causes an explosion of extraordinary energy.

*From an article by M. Przyborski, mining inspector, Budapest, Hungary, in the "Montanistische Rundschau."



WITH 12 WATER-TUBE BOILERS AGGREGATING 1,500 HP. ALTERNATING CURRENT AT 2,300 VOLTS IS USED

Avoidable Engine Accidents

By C. W. Crawford*

SYNOPSIS—When a steam engine is wrecked, faulty design is often considered the cause. As a matter of fact, however, the machine may be the only properly designed piece of apparatus about the plant. Efficient separation of entrained water from the steam is good insurance against engine accidents.

In spite of all caution and remonstrance mishaps occur to the hoisting machinery of coal mines. These are called accidents. Sometimes such mishaps are disastrous, totally or partially disabling the engines. Breaking bed plates, smashing pistons by forcing them over or pulling them off the rods; straining keys and loosening winding drums, cranks or crankpins; breaking crossheads and shearing connecting rod bolts; breaking pillow-block caps, etc., are a few of the accidents which render an otherwise good engine a veritable scrap heap. The cause of these disabilities is generally disputed, and denied even if known, but it is to be hoped the truth will prevail sooner or later.

The odium of a smashup is usually put on the builder of the engine, whereas he is generally the only innocent party in the transaction.

The True Cause Is Obvious

On actual investigation the true cause is not hard to find. Water is carried from the boilers in spray, or sometimes in solid slugs of greater volume than the clearance space in the cylinders; and water being incompressible, the law of impenetrability provides no space for it, and the piston having the right of way, the water must get out or any one of the foregoing contingencies will happen. Of course some water does get away—sometimes—into the steam chest; but the engine being in rapid motion, all the water has not the time to escape.

The piston stops dead on striking the water; but since the contact with it is made at the toggling point of the crank, the momentum of the heavy drum carries the piston forward. The pressure against it is practically incalculable—the strongest mechanical force in nature—and it is inevitable that something must break.

It is a distressful calamity to the mine owner when such an accident occurs in the midst of a cold snap and an extraordinary demand for coal, laying the mine out for a week or a month.

If such accidents were inevitable or due to some occult reason it would indeed be a calamity to all concerned; but since the cause is so transparently apparent and so clear to every one who thinks, it would appear a slur on the engineering profession.

This is no new calamity. Such accidents used to occur away back in steamboat times before the war; but the cure was found in using large steam drums.

The steam drum is now barred and debarred, ostracized, slandered and misrepresented until no one dares to recommend it. The boilermaker is the guilty party. He not only condemns the steam drum but has reduced the steam outlet from the boiler to a size inadequate to supply an engine of equivalent horsepower—and this appears to be a standard among boilermakers.

This is the first, prime, efficient cause of practically all the ills that hoisting engines are heir to. The violent ebullition in the boiler raises a spray which is caught up, together with some steam, by the pipe through which the latter passes at the rate of a mile a minute or more.

This powerful draft necessarily draws the water in swells toward the outlet and obviously must catch more or less solid chunks of water at times when, as is often the case, the water gets pumped up too high while the fireman forgets. Anyway, it is certain the water is carried into the cylinders in solid slugs, because no other medium accessible to the engine could produce such unlimited resistance.

For comparison, consider the piston which is forced on the rod at a pressure of at least 60 tons, equal to 120,000 lb. The area of the piston (24 in. diameter) is 452 sq.in. With steam at 100 lb. per square inch this is equal to a total pressure of 45,200 lb. This gives a remainder of about 75,000 lb. in favor of the piston—and this without reference to the collar at the back and the riveting at the front. Whence comes this extraneous force that wrecks engines? Steam cannot do it, and nothing else except water ever enters the cylinder.

There is still another mischief which water does in the cylinder. Mud in considerable quantity is brought over from the boilers with the water, to the detriment of valves and rings. The balanced piston rings are gummed fast with mud and the balance is thus lost, making a load of several thousand pounds to be carried by the valve. Plain water is a poor lubricant and when mixed with mud it is not improved, while the oil lubrication is vitiated.

Entrained water is heated practically, if not quite, to the point of evaporation and exhausted in spray to humidify the atmosphere. It is not unusual in dry seasons to haul water by rail 15 mi. and disseminate it in light showers after heating it several hundred degrees. But coal is cheap at the mines.

A Separator Provides the Remedy

Only one thing is needed to obviate this waste and avoid the smashups—since the boilermaker cannot be diverted—and that is a separator, one that actually separates the water from the steam and that the engineer can make for himself out of pipe fittings, or (if such can be found) buy for $50 or less. Separators are numerous enough in the market—such as they are—but their principal function seems to be to separate $150 from the operator.

The separator I refer to is not new but is known to all mechanical engineers everywhere, and consists (when made of pipe fittings) of a tee about two sizes larger than the steam pipe, which must be vertical. The tee is placed so that the side opening leads horizontally to the throttle valve. The top end of the tee is reduced by a bushing so as to fit the vertical steam pipe, the end

*Crawford & McCrimmon Co., Brazil, Ind.

of which is to have a thread sufficiently long to reach the center of the side outlet. The lower end of the tee has a short pipe attached, for a reservoir with a cap on the bottom and a trap connected to remove the condensed water. The reservoir must be large enough to accommodate any slug of water that may come over.

Such a separator will remove absolutely all the water and most of the spray that might otherwise do damage by passing through the cylinder. Its action depends on the velocity and specific gravity of the entrained water, its momentum carrying it past the side outlet into the reservoir, where it remains. The steam rises and enters the engine through the side outlet.

It is not expected that this device will give perfectly dry steam, but it at least guards against wrecking the engine. To get the best result, a dry pipe with a steam outlet at least twice the area of the boilermakers' standard should be installed in the boiler, as well as a large header line with drip pipes leading back into the boiler below the water line.

Probably not more than one engine in ten runs on really dry steam. Ordinary superheating (not extreme) renders steam dry enough, and by the time it reaches the cylinder it is toned down to about the proper saturated dryness for good lubrication and economy.

Metropolitan Editors Visit the Anthracite Field

The operators and owners of anthracite mines acted as hosts to representatives of the metropolitan press on a trip of inspection throughout the anthracite field last week. The newspaper men and journalists were taken on a special train first to Scranton, where they arrived Thursday morning, Nov. 11. Practically all of Thursday, Friday and Saturday was spent in a hurried but detailed tour, from the most northern of the hard-coal mines to the southern collieries in and about Pottsville.

It is likely that never before were mine operators subjected to such a crossfire of questions, and it is certain that never in the history of anthracite mining have the big bosses been so frank in their responses. A real effort was made to show coal mining as it actually is, and although the operators endeavored to exhibit some of their most modern operations, there was not the slightest attempt to cover the uglier sides of the business or hide the older plants.

The newspaper men were taken through breakers, power houses and all other surface buildings, while two trips were made through underground workings. In a number of places the homes of the miners were visited. Old-time conditions were compared with the more modern developments, showing at least the desire on the part of the owners to improve the surroundings of their employees. The difficulties and dangers of mining were represented in their true light, while first-aid provisions were shown and described.

The editors supplemented their visual observations with numerous notes covering such matters as wages, costs of mining, prices of coal lands and initial outlay for plants. They seemed to be more interested in what was being done to educate the miners than in the methods of getting out coal. Day and night schools came in for much comment, and it is probable that mine owners received some impressions themselves as to what the outside public expect of those who control the destinies of thousands of workingmen. The operators and their guests included the following persons:

COAL MEN

S. D. Warriner, president, Lehigh Coal and Navigation Co.
E. E. Loomis, vice-president, Delaware, Lackawanna & Western R.R.
W. J. Richards, president, Philadelphia & Reading Coal and Iron Co.
F. M. Chase, vice-president and general manager, Lehigh Valley Coal Co.
A. C. Dodson, vice-president, Dodson Coal Co.
T. M. Dodson, vice-president, Charles M. Dodson & Co.
W. L. Connell, president, Green Ridge Coal Co.
C. F. Huber, president, Lehigh & Wilkes-Barre Coal Co.
S. B. Thorne, president, Temple Coal Co.
F. H. Hemelright, vice-president, Thorne, Neal & Co.
J. B. Neale, president, Duck Run Coal Co.
F. E. Zerbey, general manager, Kingston Coal Co.
W. A. May, president, Pennsylvania Coal Co.
W. W. Ingliss, general manager, Hillside Coal and Iron Co.
Edwin Ludlow, vice-president, L. C. & N. Co.
Eli T. Conner, Hudson Coal Co.
Frank Pardee, general manager, A. Pardee & Co.
Calvin Pardee, Jr., president, Pardee Bros. & Co.
Percy C. Madeira, president, Madeira, Hill & Co.
Alvin Markle, G. B. Markle & Co.
John Markle, president, G. B. Markle & Co.
A. B. Jessup, general manager, G. B. Markle & Co.
D. B. Wentz, president, J. S. Wentz & Co.
J. L. Kemmerer, Whitney & Kemmerer Coal Co.
Charles Dorrance, Hudson Coal Co.
E. R. Pettebone, general superintendent, Hudson Coal Co.
H. H. Brady, president, West End Coal Co.
C. D. Simpson, West End Coal Co.
J. B. Dickson, Dickson & Eddy Coal Co.
Morris Williams, president, Susquehanna Coal Co.
W. H. Williams, vice-president, Delaware & Hudson Co.

EDITORS

W. E. Brigham, Boston "Transcript."
John Ryan, "Manufacturers' Record."
Louis Garthe, Baltimore "American."
E. W. Parker, Anthracite Bureau.
J. Fred Essary, Baltimore "Sun."
R. W. Wilson, Cleveland "Leader."
J. Nevin, United Press.
Mr. Robinson, Syndicate.
Frank Strother, "World's Work."
John Foord, "Journal of Commerce."
Ralph Pulitzer, New York "World."
C. M. Gilbert, New York "Tribune."
C. W. Barron, "Wall Street Journal."
C. A. Hebb, Brooklyn "Eagle."
C. J. Post, New York "Globe."
F. E. Saward, "Coal Trade Journal."
F. M. Knowles, New York "Mail."
B. C. Forbes, New York "American."
Harold M. Anderson, New York "Sun."
Harold Johnson, "Wall Street Journal."
E. Wardman, New York "Press."
Lawrence Abbott, "Outlook."
Dr. J. A. Sleicher, "Leslie's Weekly."
Mr. Blake, "Collier's Weekly."
John Gavit, New York "Post."
E. W. Scudder, Newark "News."
H. W. Coates, "Black Diamond."
Floyd W. Parsons, "Coal Age."
S. H. Barker, Philadelphia "North American."
John P. Dwyer, Philadelphia "Record."
J. H. Lambert, Philadelphia "Telegraph."
W. A. Connor, Associated Press.
George W. Douglas, Philadelphia "Evening Ledger."
S. W. Meek, Philadelphia "Press."
H. L. Collins, Philadelphia "Public Ledger."
George Rogers, Philadelphia "Inquirer."
O. Phillips, New York "Times."

Delay of Coal Shipments—In a suit against a railway company for delay in delivering a shipment of coal, the burden is on it to show that the delay was caused by a connecting line from which it received the shipment. If the delay entails loss to the owner substantially equaling the value of the shipment, he may refuse to receive the coal when tendered to him. (Alabama Court of Appeals, Goodwater Manufacturing Co. vs. Central of Georgia Ry. Co., 69 Southern Reporter, 343.)

Rocky Mountain Coal Mining Institute to Meet

The next regular meeting of the Rocky Mountain Coal Mining Institute will take place in the convention room of the Albany Hotel at Denver, Colo., commencing at 10 a.m., Nov. 29, and continuing two days.

The regular business, including the reports of committees and the election of officers for the ensuing year, will receive the attention of the institute, after which some very interesting papers will be presented and discussed.

The Albany Hotel has been selected as the official headquarters, and the management has offered the visiting members special rates in addition to the free use of the convention hall and committee rooms.

The following committees have been appointed: Arrangements—W. C. Ferguson, Equitable Building, Denver; H. C. Glaze, First National Bank Building, Denver; Samuel Tescher, Colorado Building, Denver. Entertainment—Benedict Shubart, Boston Building, Denver; W. H. Bullock, Gas and Electric Building, Denver; J. C. Roberts, Golden, Colo. F. W. Whiteside is secretary-treasurer and E. H. Weitzel the president.

October a Big Month

The month of October has been a big one in the coal industry from the point of tonnage. As a matter of fact, when the tonnages are all computed it will be found to have been one of the biggest Octobers for many years. This is owing to many causes, the chief of which are the lack of household storage, buying during the summer, an extremely warm September and trouble looming on the horizon next April.

There is no doubt that this last factor will contribute largely to the tonnage for the next five months; so with weather anywhere near seasonable the coal business is sure to be really active for some time. No particular complaint is heard about collections these days, from either the shipper or the retailer, which is certainly an important consideration.

Winter Meeting of Coal Mining Institute of America

The Coal Mining Institute will hold its winter meeting at the Fort Pitt Hotel, Pittsburgh, Penn., on Dec. 21, 22 and 23. The business session will be held at 10 a.m. of the first day. At 1:30 the question box will be opened and the following questions read: To what extent has a machine been developed for mining and loading coal? Leaders S. A. Taylor and W. A. Weldin. What part should the gasoline locomotive take in mine haulage? Is the purchase of power advisable for coal-mining operations? Leader J. F. Jenks, general manager West Penn Electric Co.

At 6:30 p.m. the institute dinner at $1.50 per plate will be held and Sion B. Smith will speak on "The Bearing of the New Compensation Act on the Coal-Mining Industry of Pennsylvania," and H. B. Mellor will explain the mining extension work of the University of Pittsburgh, with which he is associated.

On the second day, Dec. 22, W. H. Howarth, the mine inspector, will discuss "Methods of Concentrating Mining in the Lower Connellsville District" and S. B. Belden, "The Use of Storage Batteries in Mines." At 1:30 p.m. Joseph Williams will give the advantages of permissible explosives and Joseph Knapper will point out their disadvantages. Edwin M. Chance will read a paper on "Mine Gases," and G. A. Burrell will describe a new methane detector.

On the third day J. H. White, of the Bureau of Mines, will discuss "Welfare Work in Its Relation to Workmen's Compensation" and H. M. Wilson, director National Safety Council, will read a paper entitled "Workmen's Compensation and Mine Safety with Reference to Cost of Producing Coal." Adjournment will follow at noon.

Anthracite Refunds

The refund of the Pennsylvania state tax on anthracite has been delayed pending a decision on the request for a rehearing made by the attorneys for the state. It is now possible that, by the time the issue on the law of 1913 is reheard and settled, action on the act of 1915 will contrive to keep the dealers in an expectant frame of mind.

In addition to this it is now rumored that the reduction of 40c. per ton on anthracite-coal freight rates to Philadelphia ordered by the Public Service Commission will soon be again brought forward by a final decision of the commission. It will be remembered this was to go into effect last January, but was appealed by the railroads. If by a fortuitous chain of circumstances the dealers should receive a refund on this account also, it would mean a great deal to them. It is also well to recall that the reduced freight rates ordered on anthracite to interstate points by the Interstate Commerce Commission are supposed to become effective Dec. 1, to which date the order was suspended on request of the railway companies for time in which to prepare their tariffs.

Market for Coal in Portugal

Prices of coal in Portugal, already double what they were before the war, are gradually increasing, says *Commerce Reports,* and the supply of fuel on hand is small. The latest quotations for Welsh coal are $10.20 to $10.70 and $11.90 to $12.90 c.i.f. Lisbon. Lower qualities bring $9.25 to $9.50. The English freight rate is also advancing and is now $4.15 to $4.85 a ton.

Local dealers generally admit that America could supply this market if freights from the United States were around $4.85 to $6.10 per ton. Some cargoes of Pocahontas coal have arrived here recently and are giving satisfaction, but on account of the high freight it is difficult for this fuel to compete in price with the Cardiff coal generally used in Portugal.

COMING MEETINGS

The Winter Meeeting of the Kentucky Mining Institute will be held this year at Lexington, Ky., on Friday and Saturday, Dec. 3 and 4, 1915.

Illinois Mining Institute will hold its annual meeting on Nov. 20, 1915, at Springfield, Ill. Election of officers will be held and the day will end with a banquet.

West Virginia Coal Mining Institute will hold its winter meeting at Fairmont, W. Va., on Dec. 8 and 9, 1915. Secretary-treasurer, E. N. Zern, Morgantown, W. Va.

The Labor Situation

SYNOPSIS—Subdistrict President O'Neill makes further charges against Colver officials. Progress is made in Illinois in the coöperative store business. The eastern Ohio miners finally ask for lower freight rates, and evidence in the Hocking district shows that railroads make excessive profits.

It will be remembered that Charles O'Neill, subdistrict president of the United Mine Workers of America, alleged that he was violently assaulted at the Colver hotel by parties who desired to prevent him from organizing the miners at the Colver mines. (For further information see "Coal Age," Oct. 30, p. 713, and Nov. 6, p. 758). O'Neill now brings a further charge to the effect that when he was riding in an automobile with James Mooney and Armada Pellizarri, organizers of the union, he was followed by two automobiles. One drew ahead of his automobile and stopped, thus trapping O'Neill and his friends. O'Neill alleges that in the automobiles were E. F. Saxman, general manager of the Ebensburg Coal Co.; his son, P. M. Saxman, superintendent of the mines; J. Sweisle, proprietor of a hotel at Colver, and J. A. Wilkinson, Ira Meyers and Richard Crouse, mine guards at Colver. These men, he says, jumped from the automobiles and dragged the three men from their machine and beat them till they were cut and bleeding. They then jumped into their automobiles and drove off.

A Strike in Violation of Contract to Arbitrate

The union in the Kanawha district has at last induced the few miners of the Montgomery Coal Co. to return to work. Their agreement required them to arbitrate their difficulty and prohibited them from seeking to obtain a decision in their favor by abstaining from work. They were idle for seven weeks, returning to work on Nov. 11. District Vice-President J. J. Cunningham and National Organizer H. D. Friel induced them to end the strike.

The labor situation in West Virginia and Ohio is so bound up with the question of freight rates, as is recognized by the operators, miners and the public, that further reference to freight matters is permissible in this column. As has been stated the West Virginia operators have for a long time felt that the 15c. increase in freight rates west would never be put in operation.

It has been announced, though not officially, that the Chesapeake & Ohio Ry. will not file tariffs with the Interstate Commerce Commission providing for the increased rate. George F. Randolph, first vice-president of the Baltimore & Ohio Ry., is quoted as saying that his road has made no definite decision on the subject. The Norfolk & Western Ry. appears also to be undecided. A largely attended meeting of operators has been held in New York City at which matters were discussed at length with the railroads. Another meeting is set for Nov. 17 and will be held at White Sulphur Springs, W. Va.

If West Virginia Escapes Higher Freight Rates, Ohio Will Ask For Lower Rates

The eastern Ohio operators have now made complaints before the Ohio Public Utilities Commission protesting against the rates charged for hauling coal by all the four steam railroads operating in that section of the state. In doing this they supplement the action of the district officers of the United Mine Workers of America in Ohio. They request that the court will reduce the rates to a point where they will not be "unreasonable and unjustly discriminatory."

The Pittsburgh Vein Operators' Association, comprising all the principal operators in Belmont, Jefferson and Harrison Counties, filed complaints against the Wheeling & Lake Erie, Baltimore & Ohio, Pennsylvania and the New York Central, in which it is alleged that the coal rates are "excessive, unreasonable and unjustly discriminatory." The Cambria Mining Co., which operates extensive mines in Belmont County, complained separately against the rates charged by the Pennsylvania R.R. Co. and on the same ground.

Though the complaint brought by the miners' organization soon developed into a contest between the Sunday Creek Coal Co., operating in the Hocking district, and the Hocking Valley and Toledo & Ohio Central, which railroads handle most of the coal from that district, the entrance of the eastern Ohio operators with specific complaints against the four coal-carrying roads in the eastern Ohio district gives promise that an adjustment of coal rates throughout the state will be made by the Ohio Public Service Commission.

It is probable that inasmuch as the complaints of the eastern Ohio operators were made separately from that of the miners' organization and the Sunday Creek Coal Co., the eastern Ohio rates may be determined in a separate decision from those of the Hocking district.

They were induced to ally themselves in the contest against the railways because they had ceased to hope that they would be able to secure an increase of West Virginia interstate rates. It is expected to be shown that many of the railway coal rates have not been changed or revised in a generation, although methods of transportation have in that time undergone almost revolutionary changes.

Large Profits Made in Ohio Coal Transportation

The most important development when the hearing of the complaint was resumed was the evidence of Rate Expert C. W. Hillman, who went over the books of the Hocking Valley Ry., which is one of the defendants in the case. This company is earning a profit of about 200 per cent. on coal shipments from Nelsonville to Columbus and about 85 per cent. profit on shipments from the former point to Toledo, Fostoria and Marion, according to Hillman. He testified that the total cost of shipping coal from Nelsonville to Columbus is 21c. a ton, for which the shipper is charged 65c.

The cost of moving coal from Nelsonville to Toledo is about 47c., while the shipper is charged 85c. for the service. Hillman's figures also covered other points on the line. He was aided in the examination of the company's books by several other authorities, including Beman Thomas, who is the commission's regular rate expert. The hearing will probably last at least 10 days.

Attorney John F. Wilson, representing the Hocking Valley Ry., tried to undermine the testimony of C. W. Hillman. Not only did he question Hillman's impartiality and bring out the fact that he is in the pay of the Sunday Creek Coal Co., which is the force behind the miners, but he also attacked the testimony at various points by attempting to get admissions that the estimates and calculations from the Hocking Valley's books and records are inaccurate and incomplete.

The matter may have importance later if the case reaches the Supreme Court after disposition by the commission. It is to the court that appeal must be taken by either party dissatisfied with the finding made.

The principal object of attack by Mr. Wilson was Mr. Hillman's division of charges as between freight and passenger traffic. Mr. Hillman insisted that any other methods than those he used in arriving at results would make but little variation in the final figures. He declared that in one case the difference was only $5,000 in a general item of $4,500,000, or less than one-half of 1 per cent.

Illinois, Arkansas, Oklahoma and Colorado

In Illinois coöperative store management is making continued progress. The Union Fuel and Supply Co., which is really owned by local No. 755, of Staunton, Ill., has just purchased the building of Jacob Moehrman in the Luker-Moehrman-Schmidt Block. A new warehouse will soon be built near the Wabash R.R. track.

As noted in the last issue, John P. White recently took charge of District 21 and appointed executive officers in place of Peter Hanraty, of McAlester, Okla., and William McLachlin, of Huntingdon, Ark. Apparently the charges against Hanraty, like those against Howat, do not prevent his being extremely popular. Both Hanraty and McLachlin received the majority of the nominations cast for the offices that they formerly held and recently resigned. All the district officers now temporarily dispossessed in District 21 are looking for reëlection, the date of which has not yet been set. District No. 21 covers Arkansas, Oklahoma and Texas.

In "Coal Age" of Sept. 25 were recorded the conditions leading up to the arrest of Horace N. Hawkins and Fred W. Clark, counsel for the United Mine Workers, on charges of subornation of perjury. Judge Wiley, of Alamosa, quashed this case in the district court. The case was filed by Fred Farrar, the attorney-general of Colorado, and the charge was inducing Grover Hall, a juror in the trial of John R. Lawson, to make untrue representations to the effect that he had been coerced into agreeing with the verdict of guilty.

In South Wales, England, it is reported that 50,000 miners tendered on Nov. 15 two weeks' notice that they would stop work until all the men employed in the collieries joined the South Wales Miners' Federation. It is time that strict measures of control be applied to this exceptionally disloyal union.

Editorials

Beneficiary Insurance Funds

There are many operators who have started beneficiary insurance funds. *Coal Age* is anxious to obtain some account of their operations for publication so that its readers who are desirous of establishing such institutions may have an opportunity to model them on the basis of the more successful of such funds. Recently an inquiry was received asking for information, and the answer made was distressingly meager, the companies that had established such funds having been painfully modest.

The Trend of Conditions on New Coal Contracts

This is ordinarily not a season during which many fuel contracts are placed. Orders such as that at Auburn, Me., for county buildings (p. 738) awarding 500 tons for less than $4.75 for Georges Creek, however, show a normal condition for this time of year. While the Bay State Street Ry. purchase of 15,000 tons of New River (p. 738) and that of the City of Boston for 12,500 tons (p. 787) were both cases of emergency buying, partly to secure extra supplies and partly to replace coal that had been deemed unsatisfactory, the prices showed the strength of the market for spot delivery and for shipments between now and Apr. 1.

The Crocker-Burbank Co., Fitchburg, Mass., order (p. 738) for 50,000 tons of Georges Creek for 12 months from Oct. 1, also an out-of-season contract, is understood to have been placed at full circular prices, but contracts made for the year beginning Apr. 1 are on an entirely different basis.

The announcement early in October (p. 662) that one of the large distributors would name a low price for handling coal for delivery inland from Mystic Wharf, Boston, Apr. 1, 1916, to Apr. 1, 1917, has led to marked developments. From a handling charge that meant $3.60 on cars Boston if the Hampton Roads base figure continue $2.85, quotations have through competition slid down 25c. to $3.35, and probably the bottom is not yet reached. Thus we have a novel situation—prices for shipments prior to Apr. 1 quite firm, and deliveries for a year thereafter as low as any season quotation in years and with a "protection" against a further decline. A large tonnage has already been covered in for the next contract year, but for the most part it has been closed along the usual channels; that is, by shippers holding the business the current year. There are cases, however, of large tonnages being bid away by aggressive merchants, and there are cases of reprisal in plenty. All told it is unwholesome price warfare and doesn't augur very well for operating returns. The contracts closed are of the kind that are placed within limited circles and are accessible only to dealers in close personal touch.

For a time it was expected this "soft spot" would be strictly confined to inland trade "on cars Boston" and to points where other distributing ports like Portsmouth, Providence, etc., compete with Boston, but the same indications are now appearing in quotations made alongside dealers' wharves—first those accessible by lighter from Boston and latterly places accessible to steamers and barges.

The only contract activity in the Philadelphia market has been in the municipal business. The deficiency contract (No. 1573, pp. 699, 828) recently awarded by the Water Bureau was taken at very much higher prices, there being an almost complete change of contractors. The trade shows very little willingness to enter into new contracts on account of the expiration of the agreement with the miners at the end of March. This is shown by a number of small contracts going begging, such as schools and institutions. Many of these have delayed buying until now, and find few and in some instances no tenders at all for their business, compelling them to purchase at the market rates.

Usually at this time of the year the anthracite operators begin to tie up their steam users to contracts for the new year, but up to this time no effort whatever has been made in this direction, although some of the companies have announced their willingness to carry customers on the old contracts until the end of March. These are isolated instances, however, and it is expected that the companies will soon solicit their regular contracts, the delay seeming to be due more to uncertainty as to what the prices will be.

In Ohio one of the larger office buildings has laid in its supply at $1.75 per ton for Hocking nut, pea and slack delivered, while the same quality of coal was bought last year for $1.65.

The price at which the City Council of East St. Louis awarded a contract to the William Helfrish Coal Co. (p. 662) for furnishing about 1,000 tons of 2-in. shaker-screened coal to the city departments was $1.60 delivered, which was regarded as a favorable figure.

Paying Mine Workers Both for Time and for Output

The public is quite generally of the opinion that the wage based on performance—the piece or ton wage—is the one which makes most certainly for efficiency, but it may well be doubted whether that popular idea is true. A certain definite wage for a certain amount of output is eventually set, and increased advantages to the operative which will enable him to do more work are not allowed to alter the output wage.

As a result there is no tendency on the part of the employer to aid his employee by improving conditions after any of the known methods, such as training the workman, routing his work, providing him promptly with the material for his labor, speeding his machinery or providing him with efficient tools.

Thus while output wages make the workman more efficient, they make the operator less disposed to provide for economy. As a result the outcome is probably less favorable than if the workman had no interest in effective

labor, and his employer by harrying him could gather in all the profit resulting from proper methods of operating. In coal mining the operator has his coal mined at a certain price per ton, say 50c. So long as there is such a scale fixed, the operator feels no direct need to enable every man to produce a big tonnage.

In hauling the coal, in dumping and cleaning it, in providing power to mine it, the operator can make economies, but in the mining of it 50c. per ton is for him the unvarying rate, so that on about two-thirds of the cost he can make neither savings nor losses.

He may fill up his mines with unnecessary men; he can start the plant in the morning without railroad cars available and shut down the tipple after a few hours of perfunctory work; he can let the men go in to load and find their places not cut; he can permit the undercutters to find their rooms occupied by loaders; he can allow the workmen to be hampered for lack of power or of pumps or to be hindered by drivers or trackmen, or he can tie them up by bad ventilation or antiquated or expensive methods of working, and still the rate is 50c. per ton—the scale rate of the district—for there is no premium on the operator's coöperation with his men.

The workman may well be efficient out of pure honesty of disposition or solely because he likes to work hard. There are such men, but they are of course only too few. But with operators mere honest intent, mere alertness to seek the good of the workman is not enough. The mine owner and his superintendent may be both honest and alert and yet do the workmen and the state much harm.

For to get a perfect coördination between railroad employees, trimmers, rock and coal dumpers, drivers, cutters, loaders, tracklayers, pumpers and engineers involves the hiring of many bosses and the laying out of the workings at much expense to produce these results. Also sometimes the daymen whom the operator must pay must lie idle to afford the miners a chance to work. The purchase of much equipment and machinery is also necessary to enable the miner to put out a good day's output.

For the advantage of the day hands all aids to coördination and to effective output are well justified, for the operator can save by carefully watching his opportunities, but that rate of 50c. per ton to the miner and loader cannot be reduced. It is a stumbling block to economy.

For a long time it retarded the introduction of steel rails into rooms and prevented the use of reliable partings at the room necks. At one time the operator provided the props any length he chose; the men could always cut them to length on their own time. In many cases the men were asked to wander around the mines to find spikes and ties and rails in unspecified chambers and required to drag them to their own rooms for relaying. And this because the operator had no interest in efficient mining, whatever he might have in efficient transportation or dumping.

That 50c. per ton is fixed; there is no chance for him to clip it. There are many ways in which by better machinery, more superintendence, better management, more suitable equipment, training of the men and new methods of working that 50c. could be cut with benefit to both operator and miner, but one cannot blame the latter for opposing such a cut, for he cannot be sure that the advantages promised will be all they are alleged to be or will always be forthcoming.

The operator honest and alert to help the miner cannot be asked to give up his only hope of not losing money to help out the miner in this dilemma. His profits are dependent on his success in cutting down the wages of superintendence, in speeding the drivers and other day hands and on eliminating the dead work and like costs, while helping the miner tends largely to involve the operator in failure.

The interests of the miner and his employer should be one, but with our output wages the employee appears to get all the benefit. As a matter of fact he retains too much of the profit for his own good, and the employee as in all cases where an unequal bargain is driven is really the loser. Neither party can really afford to make such a contract. Nor are such agreements profitable to the state.

In fact a combination of a minimum wage plus a lower rate of remuneration per ton of output is the logical way to pay for every operation around the mine. There would be no reason then to pay for abnormal places, for cutting necks or crosscuts, for clay veins or other difficulties. The minimum rate would secure pay for the miner for all these disadvantages.

By enabling the workman to do a large day's work the operator would secure a larger output for less money. No longer would mines be filled with men above their hauling and loading capacity or beyond the ability to wash coal or use it at the ovens. The day-wage part of the contract would hinder such needless hiring of men. Nor would there be much loafing at the work, for the output wage would tend to prevent it.

But still it would be necessary perhaps to provide for hurrying up the do-less ones by providing some method of watching the work. That could be done by providing a method of longwall retreating by panels with a conveyor system, thereby concentrating the work.

An Invitation to Co-operate

We are particularly desirous that all our new readers who have come to us through the consolidation of *The Colliery Engineer* with *Coal Age* shall understand our definite policy in the matter of contributions to our editorial pages. From the beginning of its existence this paper has sought to encourage the submission of articles, letters and discussions from subscribers, with the idea of increasing the value and interest of the reading pages. We have stated frequently, and repeat now that *Coal Age* is an open forum for the expression of opinions by all responsible coal-mining people. Such views need not correspond in the least with the opinions held by the editors; in other words, the paper is the mirror of the entire industry and not a reflection of two or three individuals.

If you have never sat down and put some of your experiences or ideas into writing suitable for publication, start now by sending us a contribution for our Electrical Number, Dec. 4. Pick out the most interesting subject you know of pertaining to the use of electricity in mines and get the facts out of your system and into print. All such articles that are published are paid for; but that is the smallest part of the value received by you, for it is a fact that no work you can do will be more profitable in the way of increasing your education, multiplying your friends and extending your reputation than literary efforts in your chosen vocation.

Sociological Department

A Wyoming First-Aid Meet

By Thomas Gibson*

SYNOPSIS—Southern Wyoming gathered at Rock Springs for a first-aid contest, one team coming 159 mi. from the east and two others from a point 103 mi. in a westerly direction.

The southern Wyoming operators held the first of a series of first-aid meets at the Ball Park, Rock Springs, Wyo., on Labor Day, Sept. 6, 1915. At this meet representatives were present from the Union Pacific Coal Co., the Gunn & Quealy Coal Co., the Kemmerer Coal Co. and the Superior Coal Co. In charge of the event was J. J. V. Forbes, a first-aid instructor of the Bureau of Mines, who also announced the events.

The meet opened at 9 a.m., all the first-aid teams present assembling at the first-aid hall of the Union Pacific Coal Co. to take part in the Labor Day parade. There were eight first-aid teams in the line of march, and they were headed by the boys' band. Thousands of people lined the sidewalks to see the marching hosts, and the first-aid men availed themselves of the opportunity to perform some first-aid work for the benefit of the spectators. Their skill was awarded with much applause.

On their arrival at the ballground, Thomas James, chairman of the city council, on behalf of Mayor Anderson welcomed the many men, women and children assembled to view the contest.

The executive committee consisted of D. G. Thomas, mine superintendent of the Rock Springs mines; Thomas Gibson, chairman of the bureau of safety, Union Pacific Coal Co.; John Maxwell, mine foreman; John Sorbie, secretary of the first-aid organization; Joe Trayer, assistant superintendent; Matt Marshall, miner; Ralph Buxton, mine foreman; Charles Gregory, assistant mine foreman; Thomas Foster, mine foreman; George Smith, miner, and J. J. V. Forbes, first-aid instructor. The space marked off on the ground in which the work was to be performed measured 40x148 ft. A supply base measuring 8x8 ft. was alloted to each team for the purpose of keeping first-aid supplies. A space of 12 ft. was maintained between the team bases so as to systematize the work. All the first-aid events were performed in a space measuring 8x40 ft. immediately in front of the supply base. This arrangement afforded the thousands of spectators in the grandstand a clear view of all the first-aid events.

DOCTORS AND COMPANY MINE OFFICIALS DO THE JUDGING

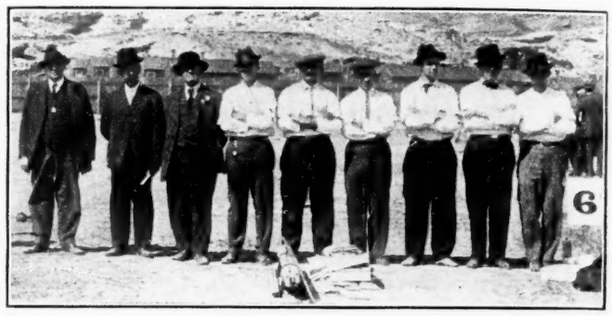
The following doctors and mine officials judged the first-aid events: Drs. J. H. Young, G. E. McDonald, J. H. Goodnough and C. F. Moon; mine officials, F. S. Davis, William M. Hartman, F. L. McCarty and Joe Traher. The progressive system of judging was adopted.

With the assistance of J. J. V. Forbes, I selected the following program of events. What these were was not revealed to anyone until the teams were on the field and ready to demonstrate their skill.

One-Man Events—A miner who has been overcome by powder smoke in his working place is found to have sustained a simple fracture of the right forearm. Remove 20 ft. to entry and treat. Time allowed, 8 min.

A miner has a severe cut on the right temple which is bleeding. The right side of his jaw is cut, and he has a simple fracture of the right collarbone. Time allowed, 8 min.

Two-Man Events—A driver is caught between two mine cars. His right eye is badly bruised, his right shoulder-blade broken and his right ear is torn. Remove 20 ft. and treat. Time allowed, 8 min.



TEAM FROM ROCK SPRINGS NO. 8, WITH VISITORS

From left to right—T. Gibson, chairman, Bureau of Safety; T. A. James, Rock Springs City Council; R. D. Oliver, miner; J. Overy, miner; T. Radalj, miner; H. Miles, cager; M. Marshall, machine runner; T. Scott, motor runner, and E. Dunn, miner, captain

TEAMS OBTAINING FIRST AND THIRD PLACES AT MEET, WITH MINE OFFICIALS

From left to right—Dr. G. E. McDonald, of Superior; G. A. Brown, mine foreman, captain; F. Swanson, electric machine boss; F. L. Davis, superintendent; E. Tinkler, miner; S. Traher, assistant mine foreman; F. Pellican, electrician, and C. Albertini, miner, all from Superior, and three others from Rock Springs who couldn't help associating with the winners; D. G. Thomas, superintendent at Rock Springs; J. Traher, general inside foreman at Rock Springs, and J. Doak, inside engineer No. 7 mine at the same place. Farther on, from left to right—J. J. V. Forbes, first-aid instructor, Bureau of Mines; G. B. Pryde, general superintendent; T. Hartney, material clerk; R. Knox, driver; J. Wise, miner; J. Goddard, electrician; C. Gibbs, tracklayer; W. Reid, machine runner, captain; F. L. McCarty, superintendent; Dr. C. F. Moon, visiting physician from Omaha; Dr. J. H. Goodnough, of Reliance, and C. Durham, general outside foreman

*Chairman, Bureau of Safety, Union Pacific Coal Co. and Superior Coal Co. mines.

A miner is found unconscious, lying face down on a live electric wire, with abdomen badly burned. Rescue and give treatment.

Team Events—A miner is found with a broken back. Treat and carry him 25 ft. on a stretcher and place him in an upright position. Time allowed, 14 min.

On a shot blowing out, a shotfirer has his right eye badly injured, his right arm broken below the elbow and his left ankle sprained by a fall. Transport 50 ft. with an improvised stretcher. Time allowed, 12 min.

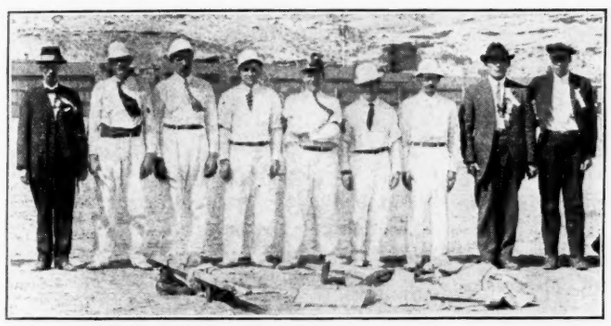
A mine worker has suffered a compound fracture of the middle of the left thigh, with profuse arterial hemorrhage, and a cut from the outer corner of the right eye to the top of the right ear, with bleeding. Time allowed, 15 min.

A powder keg has exploded, burning a miner severely on face, neck, chest and both hands. Carry 25 ft. with improvised stretcher and attend. Time allowed, 12 min.

FIRST PRIZE GOES TO SUPERIOR MINE TEAM

The first prize, a free trip to the Panama-Pacific Exposition, where the contestants were to compete for interstate supremacy, was awarded to the Superior Coal Co. team, Superior, Wyo. This prize was purchased from funds provided by the Union Pacific Coal Co., Gunn & Quealy Coal Co. and the Kemmerer Coal Co. The team scored 780 points, or 97½ per cent. of a perfect score. The names of the winners are G. A. Brown, captain, Steve Traher, Ed Tinkler, Frank Pellican, Charles Albertini and Frank Swanson.

The team from No. 7 mine, Rock Springs, Wyo., Union Pacific Coal Co., took second place with 773 points, or a rating of 96⅝ per cent. The names follow: Charles Gregory, captain, William Black, Mike Palko, B. Dallabetta, Archibald



WINNERS OF SECOND PLACE, ROCK SPRINGS NO. 7

From left to right—J. Maxwell, mine foreman; C. Gregory, assistant mine foreman and captain; B. Dallabetta, timberman; W. Black, motor runner; A. Auld; M. Palko, miner; J. Sorbie, motor runner, and T. Thomas, driver

Auld and John Sorbie. The prize which this team received consisted of $10 which had been contributed by the Labor Day committee.

The third place went to the Reliance, Wyo., team with 764 counts and a percentage of 95½. The team comprises the following members: William Reid, captain, Charles Gibbs, Joseph Wise, John Goddard, Robert Knox and Thomas Hartney. The "Journal of the United Mine Workers of America" of Indianapolis, Ind., presented six one-year subscriptions to this team in recognition of its securing third place.

The team of mine No. 10, Rock Springs, made 759 counts, equivalent to a percentage of 94⅞. Thomas Foster is captain and the team consists of George Smith, Frank Vahar, Andrew Bone, Stanley Preece and Robert Smith. Mine No. 8 at Rock Springs was fifth in order, with 757 counts and a percentage of 94⅝. The captain is Ed Dunn and his corps consists of Thomas Scott, Matt Marshall, Harry Miles, Tony Radalj and Joseph Overy.

The Hanna team of the Union Pacific Coal Co.—Thomas Town, captain, Thomas Hughes, Alfred Cheebrough, James Meekin, R. S. Barrie and Thomas Meekin—took sixth place and received 758 counts, or a percentage of 94¾. Cumberland No. 1 mine of the Union Pacific Coal Co. was represented by a team comprising F. O'Connell, captain, William Goddard, T. L. Faddies, Peter Boam, William McLean and William Gibbs. This team took seventh place, with 730 counts and a percentage rating of 91¼. The last place was secured by Cumberland No. 2 mine of the Union Pacific Coal Co. This team made 716 counts and a percentage of 89½ per cent. J. D. Jones is captain and the other men in the team are John Smith, Dan Jenkins, John Buchanan, Lyman Fearn and Nels Nelson.

At 9 p.m., the first-aid teams and the officials connected with the meet assembled at the First-Aid Hall, Rock Springs, for a smoker. After cigars were passed around, the chairman of the first-aid society, John Maxwell, called upon a number of officials and guests, who responded with short talks bearing on the future plans for increasing the scope of first-aid work throughout the state and complimenting those in charge of the meet for the systematic manner in which the meet was conducted. The affair was pronounced a great success by everyone present.

Sociological Notes

The Cost of Living Declined 5 per cent. between Oct. 30, 1914, and the same date in 1915, and 6 per cent. between Jan. 3, 1915, and Oct. 30, 1915, according to the New York "Times."

A Delayed Shot Killed Two Miners at Silver Creek Colliery Oct. 22, blowing them into such small fragments that the first-aid corps gathered up the remains in sacks.

A Special Rate for Drinking Water in Tanks of $1 per tank has been established by the Colorado & Southern Ry. for the arid coal camps of the southern district. This rate has been approved by the state Public Utilities Commission. The rate is regarded as quite low, though the haul is in every case not long.

The Rockefeller Foundation Will Spend $100,000 for the erection of model Young Men's Christian Association buildings throughout the State of Colorado. They will be erected in all but the smallest camps, but they will not be used to replace the present clubhouses, which are to be made more comfortable and uptodate in every particular. They are to include gymnasiums, swimming pools and libraries and will be splendidly equipped throughout.

The Superior Coal Co. is holding mine foremen's meetings at Superior, Wyo., and at these much interest is manifested in the discussion of vital problems in mining and management. The following meetings have been held: Nov. 3, "Haulages, Methods and Costs," Mr. Brown, chairman; Nov. 11, "Timber and Timbering," Mr. Dykes, chairman; Nov. 17, "Machines and Machine Mining," Mr. Whalen, chairman. Two further meetings have been arranged: Nov. 24, "Blasting and Drilling," Mr. Hicks, chairman, and Dec. 1, "Material and Requisitions," Mr. Paulson, chairman.

At Assumption, Ill., a Miners' Night School has been started by the Assumption Coal and Mining Co. It is intended principally for mine employees, but it is open to everyone who wishes to avail himself of the opportunity. To date, 52 men and boys have enrolled. The teaching staff consists of Professor Stanberry, T. A. Devlin, a high-school graduate and later of the engineering department of the University of Illinois, and Albert Palmer, graduate of the normal school and a former school teacher. The class has elected the following officers: T. J. Connolly, mine superintendent, president; F. E. Taylor, electrician, secretary; and A. Palmer, machinist, treasurer.

The Colorado Fuel and Iron Co.'s Industrial Bulletin, a quarterly periodical measuring 8x10⅝ in., was issued first in October of the present year in accord with the agreement between the company and the mine workers in that month. It has an illustrated cover and 31 pages of type matter and illustration. It contains a list of the officers, mine superintendents and employees' representatives, a letter from the president, J. F. Welborn, some notes of interest about the John D. Rockefeller, Jr., trip, full-page illustrations of Rockefeller and of the conferees at Pueblo on Oct. 2, an open letter from Rockefeller in four languages, the Rockefeller address, the plan of representation, the memorandum of agreement, a diagram representing the method by which grievances can be adjusted, a summary of the voting and an account of the public-school conference.

The State Mine at Wonthaggi in Victoria, Australia, is the largest coal producer in that island continent. After allowing $224,541 for "depreciation, sinking fund, etc.," a net profit of $5,895 was obtained in the fiscal year ending June 30, 1914. The output was 2,576 short tons per day, and about 1,000 men were employed, only 450 of whom were mining coal on contract rates. The total output of coal for the fiscal year already mentioned was 616,120 short tons, valued at $1,203,083. The price was therefore $1.95 per ton. The miners averaged $3.40 per shift. The output obtained constituted 89 per cent. of all the coal mined in the province of Victoria. The price obtained for the coal is generous, the wage not inordinately large and the profit beggarly. It all goes to show that mining is being conducted with better results to all concerned under the capitalism of America than under socialism in Australia. It may be noted, moreover, that the "depreciation, sinking fund, etc." is large, being 18.66 per cent. of the value of the output, or 36c. for each ton mined. The profit was larger in the year preceding that under discussion, when it was $201,110.

Discussion by Readers

Store Checks vs. Thrift

Letter No. 3—There is no doubt that thrift among the mining classes is one of the most important questions that coal operators will have to face in the near future as being the only means of putting the mining industry on a firmer basis. The lack of thrift among miners has caused them to demand mining rates that have been prohibitive in many districts and coal fields, and those districts have suffered as a result.

Observation shows that the average miner is living from day to day with little or no thought of the future. Many do not care to work every day when they have a chance, but aim to make just enough to cover their store accounts. It is unnecessary to remark that a miner of this class has lost his ambition. He cares little how long he remains in one place, since he has not established a home that will make him contented to spend his evenings with his family. In fact a comparatively small proportion of mine workers have many things that make life worth living. These are the men whom one finds lounging in the company store after working hours. They can tell you how they would run the mine if they were boss, but they never realize that they are themselves the biggest obstacle with which the boss has to contend.

Conditions Surrounding the Miner

When the mines are working full time, the average miner should be able to make from $60 to $65 a month clear. While it is true that no man would get rich on this income, it is likewise true that if used in the right way the money will keep a medium-sized family in fairly good circumstances. For example, compare the average miner with his brother workman in the factory or the shop. By attending to his work and saving his wages, this man manages to buy a little home, though his earnings are often not as large as those of the average miner. This comparison shows that there must be something radically wrong in the attitude of the miner toward his work. He can make good money if he will, and he has every opportunity to save his earnings, as his expenses in a mining town are not great; but how rarely he does this.

The problem presented to coal operators by reason of this condition in mining towns is the providing of suitable means whereby their employees will be able to get the most for their money and at the same time to encourage them to save a part of their wages and to put this aside as a bank account. If the men can be induced to do this, it will generally prove a greater incentive to work and to improve their circumstances than anything else.

I have observed many improvements in the management of the company store, but it is a fact that the higher mine officials often value a man according to the amount he spends over the counter. He may be the most worthless fellow in the mine, but the foreman is unable to get rid of him on any pretext whatever. The man may not do 50c. worth of work in a shift if employed as a dayman, but the fact that he is getting $2 a day and leaving every cent of it in the store is sufficient to keep him on the payroll. A little reflection should show the management that this is a "leak in the payroll" that should be stopped. Where this condition exists it is easy to see that the commissary receives the first consideration. I am glad to say, however, that this is not the case in every mining town.

The Purchasing Value of Scrip

Few miners consider the value of scrip equal to that of the money it represents. In most camps scrip can be purchased at from 75c. to 90c. on the dollar, and it is handled with about as much care as so much old paper. A child is sent to the store with $5 or $10 of scrip, when it would not be trusted with the same amount in good old greenbacks. Purchases with scrip are often made with the same careless disregard of the value represented.

This failure to regard the money value of scrip is increased in many cases by the urgency of the store manager, who often induces a customer to buy goods that he really does not need. It is still a common practice for some companies to hire a store manager at a small salary and give him in addition a percentage on the sales he makes. Such an arrangement is productive of more harm than good, as it tends to impoverish the customer and in the end works against the best interests of the company. The light esteem in which the company scrip is held by the average miner makes his purchases in the store seem to him like getting something for nothing.

Can a Commissary Be Run Without Scrip?

I realize that commissaries are a necessity in many mining camps, but there is no reason why the scrip system cannot be abolished. This might cause some inconvenience for awhile, but the results would more than repay the operators for their trouble in making the change. I want to suggest that a commissary could be run to advantage on a profit-sharing system and stocked with the best grade of goods that can be sold to the mining trade at a fair profit. Then, at the close of every six or twelve months, after deducting a certain amount for running expenses and interest on the money invested, the remaining profit could be divided among the employees in proportion to the amount of their several purchases. It might be well to make the rule that only those employees who have been with the company for a certain length of time would be included in the profit-sharing scheme. I believe that such a system would tend to rapidly reduce shiftlessness among miners. A similar system has worked wonders for certain street-car companies, and it could certainly be adapted to the commissary trade.

Need of a Bank or Depository

While discussing the store system, let me suggest that it would be a good plan to have a bank or depository established in all mining camps, where miners could make deposits every payday, putting aside a portion of their

earnings. I have in mind a certain mining district where several such banks have been established and are operated as purely commercial banks, but no systematic effort is made to induce the miners to patronize them. On the other hand, in some cases such a bank even goes so far as to furnish the company with pay envelopes bearing the address of the bank and commenting briefly on the advantage of a bank account to every man. This has the effect of reminding one when he draws his pay that it is good policy to start and keep up a bank account, no matter how small the deposits he may make.

Logan, W. Va. C. J. FUETTER.

Letter No. 4—If the average miner's wife were permitted to talk to the mine official referred to in the Foreword entitled "Store Checks vs. Thrift," *Coal Age,* Oct. 16, p. 619, she would unburden her mind to him about as follows:

"The fact that you did stop and think means that you are really interested in your employees, but if you were more fully acquainted with the conditions under which the miner's wife labors in her efforts to supply the daily needs of her family, you would know that the removal of the check system as a means of promoting thrift among your employees is based on a fallacious foundation."

With all due respect to men, the average experience of miners' wives is that their husbands habitually spend more than they can afford because they have been so long accustomed to support only themselves. I want to say that the check system is a blessing to the large majority of miners' wives because it gives them an available credit in the store that permits them to purchase the needed supplies for the family. When living at mines where the check system was not employed, the children and myself have often gone without suitable food and clothing, owing to my husband spending the money for things that were not needed in the home.

REASONS FOR HIGH COMMISSARY PRICES

It is true that commissary prices are often outrageously high. In some cases it has taken all that my husband could earn to buy the absolute necessities of life. I have sometimes wondered whether the peonage system in Mexico can be much worse than the conditions prevailing at many of the coal mines in this respect. The reason for these high prices is to be found in the fact that the storekeeper is instructed by the management to make a certain percentage on his goods, which is the only requirement. Many storekeepers come to understand that whatever they can make on the goods beyond this requirement stands to their credit.

Naturally, the storekeeper is not a very energetic man. He generally considers that if he sells a pair of shoes at 100-per cent. profit, the gain will be greater than to sell three pairs of shoes at 30-per cent. profit, and the transaction will cost him less effort. He applies the same principle to all the goods in the store. The charge for staple goods is generally 5c. more per can than elsewhere, and the price for meat practically forbids its purchase by most of the miners.

The natural result of these conditions is that a large proportion of the miners cash their checks at 20-per cent. discount and go into town, where they can buy the same goods for less money. There is often a great difference in the prices asked for goods in different camps. I have known a $5 purchase at one camp to be equivalent to an $8 purchase at another adjoining camp, with the result that the latter place drew the trade from the former.

Listen to what another woman might say, were she given the opportunity to unburden her mind in reply to the reflections of the president of the coal company as described in *Coal Age.* It would be about as follows:

"Our president has never come to look into the welfare of his camp as you have done. He knows nothing of the existing conditions and does not realize that he is getting his coal mined almost gratis. His mind is absorbed with the one idea of making money. His instructions to the storekeeper are, 'Put your prices as high as you can'; and they are certainly exorbitant."

After listening to this testimony, does it occur to any coal-mining president that the removal of the check system at the commissaries will lessen the burdens of his employees or remedy the existing evils?

THE OTHER SIDE OF THE QUESTION

The study of this question suggests that more would be accomplished if, instead of removing the check system as applied to commissaries, the management would instruct the storekeeper as follows: "You are required to make a certain fixed profit on the sale of goods, and no more. We would prefer that you sell three pairs of shoes at 30-per cent. profit rather than one pair at 100-per cent. profit. By so doing, you will hold the trade of the entire camp and satisfy our employees. Failure to follow these instructions will forfeit your position with the company." In addition to these instructions, the management might occasionally send a man around to see that his orders were carried out.

Following up the same line, the instructions to the superintendent should be to encourage gardening by every means in his power and to see that fertilizer and proper fencing are supplied at a nominal price (or better, at cost) to all living in the camp. Proclaim a gardening day when the mines will be shut down to give the men an opportunity to perform the necessary work in starting their gardens; also see that housewives are provided with such conveniences for their work as will tend to conserve their energies, that they may have some time and strength left for tending gardens. It may be suggested that the raising of garden vegetables will reduce the sales at the commissaries. There is little fear of this, however, as the money thus saved will be spent for other things at the stores, and a higher type of living will result.

By following these suggestions, let me say that the mine management will be teaching us thrift both by precept and example, and we will not be slow in catching the spirit manifested.

EXAMPLES OF GOOD COMMISSARY MANAGEMENT

B. F. Roden, owner and operator of the Roden Coal Co., Marvel, Ala., stated, in the beginning, that he was in the coal business and not in a mercantile business; that his commissary was to be run for the convenience of his employees. His storekeeper went to surrounding camps and towns to obtain price quotations, and his prices were brought to the same level or slightly lower. The result is that there is established at this mine an uptodate department store, which does a large business both inside and outside the camp. This is an ex-

ample of what can be done in this direction by a small company. In addition to this, gardening is encouraged throughout the camp.

The Tennessee Coal, Iron and Railroad Co. is another example of good commissary management. The storekeepers of this company are instructed to make no more than a certain percentage of profit, which is low. The prices of all staple goods are fixed and subject only to market changes. Each storekeeper is required to send in a monthly report on his prices, and if he has overlooked any of the general market quotations to which his prices do not conform, he is promptly advised of the same. It is the custom in these stores to make small change and to cut the price below the usual nickel or dime when this is possible. If a customer presents a 10c. check in payment for an 8c. purchase, he is given 2c. in change. I want to ask, Is not this teaching thrift by example rather than by precept?

Results of Good Commissary Management

Experience has proved that commissaries conducted on the plan just described are proverbially successful. They build up a large trade and are patronized by the country for miles around. When fully carried out, the plan makes it optional to the miner or company employee whether he trades at the store or not. Also, he can either use the check system or, if he prefers, draw his money on payday and purchase his goods for cash. But a dollar in cash or in checks always buys a dollar's worth of goods. Thus, many of the burdens are lifted from the miner's wife. Companies that have adopted these plans give much attention also to the encouragement of gardening. Prizes are offered for the best gardens and lawns, and the companies often furnish the fertilizer, besides doing the plowing of the gardens.

In closing I want to emphasize the point previously stated—that the adoption of these methods is a greater schooling in thrift than can result from the abolishing of the store-check system. I want to suggest that, for the protection of the miners in many camps, it might be well for the mining department in the state to make and enforce rules regulating commissary prices on the necessities of life. A Miner's Wife.

Wylam, Ala.

A Flooded-Mine Proposition

Letter No. 2—Referring to the inquiry in regard to a flooded mine, *Coal Age*, Oct. 16, page 646, what strikes me most forcibly is the risk that was taken in driving rooms 40 ft. wide in the direction of old and abandoned workings. To the onlooker this seems to be the height of foolishness. It may be true, of course, that the management of the mine and the engineers were not to blame, owing to an incorrect survey and map of the old workings. Had this map been correct and available, it would have shown how far it was possible to drive the rooms in this mine and still leave a safe solid pillar of coal between it and the old workings. The map of the abandoned mine would also give an idea of the body of water accumulated therein. If complete, it would also show if the dip mentioned as existing at the face where the water broke through was a general dip.

Assuming that the seam is fairly flat, as stated in the reply to this inquiry, it is probable that the reduction in the quantity of water flowing into the new workings is largely owing to a decreasing head of water in the old mine and not to be wholly attributed to the heaving of the bottom. This would also be the case if the abandoned workings lay mostly to the dip of where the machine mined through the pillar.

Considerations in Building a Dam

The plan of this section of the mine given on page 646 does not show the distance that No. 4 room is driven ahead of No. 5. The pillar between these two rooms being only 4 ft. thick is not sufficient to give a firm foundation for a dam across the face of No. 4 room. In building this dam, therefore, as it will be necessary to cut in on both ribs in order to secure a good foundation, this can only be done safely when No. 4 room is from 12 to 15 ft. ahead of No. 5 room.

Assuming, as suggested, that the head of water is 100 ft., the pressure would be $62.5 \times 100 = 6{,}250$ lb. on every square foot of the dam. The room being 40 ft. wide and $4\frac{1}{2}$ ft. high, the total pressure on the dam is $6{,}250 \div 2{,}000 \times 40 \times 4\frac{1}{2} = 562.5$ tons, which would require a strong foundation. It will also be necessary to cut the roof and floor in the same manner as each rib and to a depth that can be determined only by the nature of the strata. I should adopt the method of first building a substantial bulkhead at least 3 ft. thick on a curve convex toward the face of the coal. While this work is being done, it will be necessary to make adequate provision for taking care of the water, and to do this, pipes or manholes should be laid in the bottom of the dam. When the work is complete, these pipes can be closed by a plug drawn into the opening from the inside by means of a chain and tightened by a screw or lever so as to make them water-tight.

Having completed this bulkhead, I would adopt the plan suggested by *Coal Age*, taking the additional precaution, however, of lining the inside of the bulkhead with a layer of horse manure or moss, which would greatly assist in preventing leakage through the dam. Depending largely on the strength of the bulkhead already built, I would make the concrete wall on the inside of this bulkhead, say, 24 in. at the bottom with a less thickness at the top. I would employ a mixture of one part cement and two parts fine sand, with sufficient water to enable the concrete or grouting to be handled readily.

If there is not sufficient room at the face of No. 4 room to give a good foundation for the dam, it will be necessary to build good dams across the left-hand crosscuts in No. 4 room and the right-hand crosscuts in No. 5 room. Anon.

——, Penn.

[The foregoing letter was unsigned. The plan of building a dam from room pillar to room pillar, as described by this correspondent, is certainly a precarious one. The suggestion made in *Coal Age*, page 646, was to grout in, solid, the faces of rooms 3, 4 and 5, and others if necessary, which could only be determined by test boreholes drilled in the face of each of the rooms in this block of coal.

We would suggest that, under the assumed head of 100 ft., no actual dam would be safe built across the face of a room 40 ft. wide. As has been suggested, however, it is very probable that there is no great head of water

to be encountered in this case, since the formations are generally level. But, by building up the faces of all rooms, where it is found to be necessary, with solid concrete, as we suggested, to a depth of 8 or 10 ft., there should be no further danger from the water breaking through into the live workings.

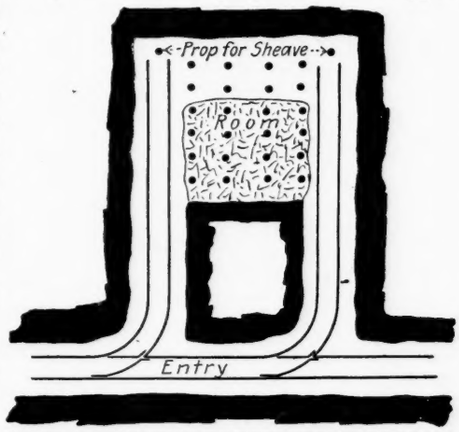
Of course, no further work can be done in this section of the mine without keeping boreholes a considerable distance in advance of the working faces. If possible, the water should be drained from the abandoned mine and an investigation made to find the extent of the workings in that mine.—Editor.]

Handling Cars on Pitches

Letter No. 1—The inquiry on this subject by "Mine Superintendent," *Coal Age*, Oct. 23, p. 687, is so thoroughly answered by the editor that there is not much to say in addition. But as I have had some experience with double-track, gravity or self-acting planes in rooms and believe they can be used successfully on any pitch over 5 deg., I may be able to offer some practical suggestions.

Instead of using a piece of chain or cable to fasten the sheave clevis to the prop, I have used a solid ring, which the blacksmith can make in a few minutes of round iron or scrap if it can be found. This ring should be large enough for any prop and is slipped over the bottom of the prop before setting it.

Instead of using a single sheave, which necessitates the tracks being close together and does not permit of the car being pulled up close to the prop, I would suggest driving the rooms double, as shown in the accompanying illustration, and laying each track along the rib. Then set a post for a sheave at the head of each track and extend the rope along the face of the room between the sheaves. This will allow each car to be hauled closer to the face and also lessen the distance it is necessary to handle the coal when loading. If roof conditions will permit, the rooms can be driven 40 ft. wide.



SELF-ACTING INCLINE IN A DOUBLE ROOM

When drawing back the pillars, in this system, the pillar should be cut through from each side, at the face, before changing the rope. Then the rope should be carried across the face of the room and made to operate the cars on each side of the pillar, which avoids the gob or waste stored in the center of the room. Where thick pillars are used and there is much gob, the advantages of this track arrangement will be obvious.

I would also suggest the use of thimbles and clips to fasten the rope to the clevis on each end, thus lessening the wear on the rope and breakage of strands and keeping the rope from getting tangled and kinked, besides permitting it to be lengthened easily and quickly, as the room advances. The surplus rope should be neatly coiled and tied and hung on the end of the car, otherwise it may give trouble. Where sufficient rope to work out a room will make too bulky or cumbersome a coil when the room is being started, different lengths of rope can be used, starting with, say 75 or 100 ft.; and when this is run out, either splicing on another piece of about the same length or moving the short piece ahead to a new room and putting on a piece 175 or 200 ft. long, etc.

I would caution "Mine Superintendent" by saying that my experience has been that this system will not work itself, especially at the start, but must be given considerable attention. The men must be thoroughly trained and instructed in its use and then watched to see that they follow instructions, for it has failed in a number of instances when the system has been misused.

On one occasion, for example, I gave instructions and provided material for the installation of this system in some rooms, in a mine under my control. Shortly after, I was advised by the local superintendent that it would not work and, on inquiring the reason, was told that everything was wrong with it and nothing right and it simply would not work. On personal investigation I found that the necessary material was furnished the miners, but no effort at all had been made to instruct them in its use or to see that it was properly used and kept up.

When the car in the room was loaded and the empty car in the neck attached to the rope, the loaded car was turned loose. No attempt being made to brake or sprag the car, it ran down the incline, jumped the track and ditched in the entry. The empty car, on the other end of the rope, at the same time, was dragged at full speed into the prop to which the sheave was attached, car, prop rope and sheave landing crossways about the middle of the room. Moreover, no attempt was made to coil or otherwise care for the surplus rope, and it was tangled, twisted and dragged all over the room. When the cars had been started on their wild career, everybody in the vicinity had to run to keep from being picked up by the rope and carried along. Of course it wouldn't work. But after a little time and patience had been used in instructing, training and watching the men, no further trouble was had with the arrangement, and it has since worked well.

EDW. H. COXE.

Knoxville, Tenn.

Mine Discipline Imperative

Letter No. 2—A recent editorial on this subject, *Coal Age*, Oct. 2, p. 552, is full of pertinent matter suggesting much thought. I advise everyone who has missed this article to look up his back number of *Coal Age* and read the same.

My personal opinion is that the definition of the word "discipline," as conceived in the good old days, is undergoing somewhat of a change at the present time. Indeed, my observation convinces me that this is a fact. The reason for this gradual change in the popular idea of discipline may perhaps be ascribed to the development of the safety-first idea and in part to the evolution of that dire word "efficiency."

Safety first is a grand thing, and it is little wonder that so many companies today hold it in high esteem. It is in fact a great incentive to permanence, progress and

prosperity in the industrial world. The phrases, "safety first" and "stand out from under" are strangely illuminated expressions and demand strict compliance with the mandates. Surely our ideas of discipline are changing, and there is a reason.

Observe, for instance, that throughout this wide land the attitude of capital as represented by its management toward that necessary giant, Labor, is manifestly one of caution and doubt, combined with a certain respect of the one for the other. To illustrate: When a child gets to the point where he begins to talk back—when parental discipline is met with sullenness and anger instead of remorse and penitence, then indeed it is time for the parent to sit down and carefully consider his methods of dealing with the insubordinate child.

Applying this simile to the industrial world, the time has come for reflection on the methods to be employed in dealing with labor problems. If respect, obedience and confidence are to be retained, something else must be substituted for the peremptory demands, chastisement and force formerly used in maintaining discipline. The employer and employed alike are coming to realize and grasp the spirit exemplified in the saying, "Let us sit down and reason together."

Efficiency! Did you ever hear that inscrutable word before? What a meaning it conveys in the efforts being made today for betterment. But even yet, if the word is merely whispered in their presence, some managers will act in a very strange manner and display a rough, unapproachable exterior. Nevertheless, "Efficiency" is the slogan. No other term can take its place or convey the same meaning. Its transformations are magic.

Both discipline and the disciplinarian have been carefully inspected by this guardian of progress, Efficiency. Motion pictures have been made of the tracklayer at work, and these have been carefully studied with the result that disciplinarians have been gradually transformed into men of another type. Their heads are longer and their necks are not as thick as formerly. They lack nothing in physical courage. Today, however, the disciplinarian admits that he cannot lick the tracklayer if it comes to a mix, and as a consequence they do not mix. Better results are accomplished by other means and methods. Is it strange that costs of production are lower and there are less tension and fewer accidents—less noise and confusion and sweat? In fact, there is better discipline in the mines of today. Look up the meaning of the word in Webster's Unabridged Dictionary.

CARSON W. SMITH,
The Consolidated Coal and Coke Co.
Dacona, Colo.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Metric Abbreviations—The following are the common abbreviations used in the metric system:

Milligram,	mg.;	millimeter, mm.;	milliliter, ml.
Centigram,	cg.;	centimeter, cm.;	centiliter, cl.
Decigram,	dg.;	decimeter, dm.;	deciliter, dl.
Gram,	g.;	meter, m.;	liter, l.
Kilogram,	**kg.;**	kilometer, km.;	kiloliter, kl.
Square millimeter,	mm^2;	cubic millimeter,	mm^3.
Square centimeter,	cm^2;	cubic centimeter,	cm^3.
Square decimeter,	dm^2;	cubic decimeter,	dm^3.
Square meter,	m^2;	cubic meter,	m^3.
Square kilometer,	km^2;		

Compound Units—It is often convenient to express values involving two or more denominations in terms of a single compound unit. The following are examples of such compound units:

Work is expressed as a force (pounds) exerted through a distance (feet) and its unit, therefore, combines both of these denominations, giving foot-pounds (ft.-lb.), or inch-pounds (in.-lb.), as the case may be.

Power is expressed as work performed per unit of time, as foot-pounds per minute (ft.-lb.p.m.), or per second (ft.-lb.p.s.).

In like manner, the speed of rotation is given in revolutions per minute (r.p.m.); or the speed of a train as miles per hour (mi.p.hr.); or the velocity of an air current as cubic feet per minute (cu.ft.p.m.).

It is common to estimate the value of coal lands in tons per acre, or **acre-tons;** or to express the amount of underlying coal in **acre-feet,** which combines in a single unit both the acreage of the seam and the average thickness of the coal in feet.

CONVERSION TABLES

Numerous forms of tables are in use for converting denominations of the United States system into the corresponding denominations of the metric system and vice versa, but the following are believed to best serve the purpose. For the sake of more ready reference, the denominations of weight, length, area, volume and capacity are here given in separate tables, and the values given in the tables are simple multipliers:

AVOIRDUPOIS (METRIC TO U. S.)

		Drams	Ounces	Pounds	Tons
1 milligram	=	0.00056			
1 centigram	=	0.0056			
1 decigram	=	0.0564			
1 gram	=	0.564	0.035	0.0022	
1 decagram	=	5.644	0.353	0.022	
1 hectogram	=	56.438	3.527	0.220	
1 kilogram	=	564.38	35.274	2.205	0.0011
1 myriagram	=			22.046	0.0110
1 quintal	=			220.46	0.1102
1 tonne	=			2204.62	1.1023

When closer determinations are desired the values given in the metric tables should be employed.

The Coal Age Pocket Book

AVOIRDUPOIS (U. S. TO METRIC)

		Milligrams	Grams	Kilograms	Tonne
1 dram	=	1771.8	1.77		
1 ounce	=		28.35	0.02835	
1 pound	=		453.59	0.4536	
1 ton	=			907.184	0.90718

TROY (METRIC TO U. S.)

		Grains	Penny-weights	Ounces	Pounds
1 milligram	=	0.0154			
1 centigram	=	0.154	0.006		
1 decigram	=	1.54	0.064	0.0032	
1 gram	=	15.43	0.643	0.032	
1 decagram	=		6.430	0.322	0.0268
1 hectogram	=		64.302	3.215	0.2679
1 kilogram	=			32.151	2.679
1 myriagram	=				26.79

TROY (U. S. TO METRIC)

		Milligrams	Grams	Kilograms
1 grain	=	64.8	0.065	
1 pennyweight	=		1.555	
1 ounce	=		31.103	0.031
1 pound	=			0.373

APOTHECARIES (METRIC TO U. S.)

		Grains	Scruples	Drams	Ounces	Pounds
1 milligram	=	0.0154				
1 centigram	=	0.154	0.0077			
1 decigram	=	1.54	0.077	0.026		
1 gram	=	15.43	0.772	0.257	0.032	
1 decagram	=		7.72	2.57	0.322	
1 hectogram	=				3.215	0.268
1 kilogram	=				32.15	2.679

APOTHECARIES (U. S. TO METRIC)

		Milligrams	Grams	Kilograms
1 grain	=	64.8	0.065	
1 scruple	=		1.296	
1 dram	=		3.888	
1 ounce	=		31.103	0.031
1 pound	=			0.373

LINEAR (METRIC TO U. S.)

		Inches	Feet	Yards	Rods	Miles
1 millimeter	=	0.039				
1 centimeter	=	0.39	0.033			
1 decimeter	=	3.94	0.33			
1 meter	=	39.37	3.28	1.094	0.199	
1 decameter	=		32.81	10.936	1.988	0.0062
1 hectometer	=			109.36	19.884	0.0621
1 kilometer	=					0.6214
1 myriameter	=					6.2137

The old surveyor's chain (66 ft.) contains 20.1168 meters, and one kilometer (3280.83 ft.) is 49.71 of such chains.

Inquiries of General Interest

An Electrical Transmission

Will you kindly answer the following question: What size of wire will be required to transmit the power necessary to operate three 30-hp. motors located at a distance of 4,000 ft. from the distributing point? These motors are rated at 105 amp., and we have 250 volts direct current at the switchboard. A. N. YOUNG.

Masontown, Penn.

Correspondent has not given sufficient information to enable us to give a wholly satisfactory answer to his question. Assuming, however, that these 30-hp. motors have an efficiency of, say, 90 per cent. and that each motor takes a current of 105 amp. in developing this power, the voltage to be delivered to the motors will be

$$E = \frac{30 \times 746}{0.9 \times 105} = 236 \textit{ volts}$$

If this is the voltage to be delivered to the motors, there is a permissible line drop of 250 — 236 = 14 volts.

The proposition on this basis is therefore to transmit a current of 3 × 105 = 315 amp. a distance of 4,000 ft., with a line drop of only 14 volts. Allowing for a wire return, the area in circular mils required for this transmission is

$$A = \frac{21.6 \times 4{,}000 \times 315}{14} = 1{,}944{,}000 \textit{ circ.mils}$$

Since 1 circ.mil is the area of a circle 1 mil in diameter and a mil is one-thousandth of an inch (0.001 in.), the diameter of wire required in this case is

$$d = \sqrt{\frac{1{,}944{,}000}{785{,}400}} = 1.57 \textit{ in.}$$

This would make a very expensive installation, and we would suggest that the most feasible alternative is to employ a higher switchboard voltage that will permit a greater line drop. By raising the voltage at the switchboard to 275 volts, the permissible line drop would be 275 — 236 = 39 volts. There would then be required

$$A = \frac{21.6 \times 4{,}000 \times 315}{39} = 697{,}850 \textit{ circ.mils}$$

The diameter of this wire would then be

$$d = \sqrt{\frac{697{,}850}{785{,}400}} = 0.94, \textit{ say } \tfrac{15}{16} \textit{ in.}$$

Owing to the high cost for copper required for this work, it would have been much better to have employed alternating instead of direct current. This would have made it possible to introduce transformers and "step up" the voltage to any desired pressure, for the purpose of transmission. By this means a smaller wire could be used and the copper cost greatly reduced.

It is possible to install at the power house a motor-generator set and change the direct current of the generators into alternating current for transmission. That, however, would not be a commercial proposition. What should be done, in this case, is to discard the present direct-current machines and in their place install alternating machinery capable of generating current at, say 2,300 volts; transmit this current to the point of distribution and there convert the alternating current into direct current by means of a motor-generator set.

Mine Gases Known as "Damps"

At a recent meeting of mining men the question was asked, "Why do the miners refer to mine gases as 'chokedamp,' 'blackdamp,' 'whitedamp,' etc.?" I would like to know if you can answer that question, stating when and how this term came to be used in respect to mine gases.

Landgraff, W. Va. THOMAS NORRIS.

The term "damp" is of Dutch, Danish or low-German origin, corresponding to the German *dampf* and meaning a vapor or fog. The term was applied in the earliest days of mining when the miner first became conscious that mine air contained noxious gases of which he had little or no knowledge.

Later, as the characteristics of the different mine gases became known, the miner designated them according to their observed effects. The general term "stonedamp" was applied more or less generally to all the mine gases, as coming from the rock strata.

Carbon dioxide (CO_2), mixed with more or less nitrogen as the result of the different forms of combustion constantly taking place in the mine, was designated by the terms "blackdamp" or "chokedamp," because of its choking effect, these gases being irrespirable and producing suffocation.

Carbon monoxide (CO) has been generally termed "whitedamp," probably because of its prevalence in low, damp and poorly ventilated places, where a fog or mist is often to be observed in the mine. It is not to be inferred by this that carbon monoxide is visible, but that it received the name of "whitedamp" because of its association with such places, the fog being mistaken by the early miner for this deadly gas.

Marsh gas mixed with air in inflammable or explosive proportions was naturally termed "firedamp," while the deadly gaseous products remaining after an explosion in the mine were termed "afterdamp."

Sulphureted hydrogen (H_2S) received the name of "stinkdamp," because of its nauseating smell, which resembled that of rotten eggs.

These terms will be found fully explained in the chapter on "The Common Mine Gases," in "Mine Gases and Explosions," Beard. Some confusion exists in respect to the correct meaning and application of the two terms "blackdamp" and "firedamp." Blackdamp is often taken to refer to carbon dioxide (CO_2), whereas it was properly and originally applied to the extinctive products of combustion, consisting of a mixture of nitrogen and carbon dioxide. The term "firedamp" originally described an inflammable or explosive mixture of mine gases consisting chiefly of methane (CH_4) and air. The mixture must be such as to inflame or explode in contact with flame.

Examination Questions

West Virginia Examinations, Oct. 26-28, 1915

(*Selected Questions*)

Ques.—In driving entries or rooms that are known to liberate explosive gases, what precautions would be necessary to insure the safety of the workmen?

Ans.—Only safety lamps should be used in this work. A good current of air should be directed well into the face of the entries or made to sweep the faces of the rooms. To do this, it may be necessary to erect lines of brattice extending to within a few feet of the working face. The brattice should be so placed that the intake air will pass up behind the brattice on its way to the face. The safety lamps must be closely watched to observe the first indication of any increase in the amount of gas present in the air. Where gas is coming from the roof, special attention must be given to the timbering in order to prevent undue roof falls, which might liberate a large quantity of gas suddenly. Where the coal is blasted, only permissible powder should be used and moderate charges employed. All shots should be inspected and fired by competent shotfirers, and tests should be made for gas in the place where a shot is to be fired and in the adjoining places before setting the blast.

Ques.—Would you consider it safe to work with open lights in any portion of a mine liberating explosive gases?

Ans.—This question is one of growing importance in coal mining; it is the old question of using mixed lights in a mine generating explosive gases. While many such mines are worked with mixed lights at the present time, the practice cannot be said to be commonly safe. There are many unforeseen conditions that may arise that would render the presence of open lights in any part of the mine exceedingly dangerous. It is well known that the flow of gas from rock strata is not uniform. At times heavy gas feeders are encountered that quickly overcharge the mine air in those sections of the mine where the gas is liberated. Also, the flow of gas is spasmodic. It frequently happens that sections of the mine that have not been troubled with gas for some time suddenly become gaseous. This may be due to a squeeze occurring in the gaseous section, and although the effect may hardly be appreciable in the working of the coal, it would endanger the open-light section.

A heavy fall of roof occurring in the safety-lamp section might cause an outflow of gas from that section onto the roads and into the workings of the open-light section. Any derangement of the circulation, owing to the failure of the ventilator or the setting open of a door, would menace the entire mine. Perhaps the greatest danger in the use of mixed lights is the possibility of a driver or other employee inadvertently carrying an open light into places where gas is being generated. It frequently happens that open lights are permitted on the airways of a mine, while only safety lamps are allowed at the faces of the rooms. This practice is exceedingly dangerous and should never be permitted.

Ques.—What is a safety lamp?

Ans.—As this term is understood in coal mining, a safety lamp is a gauze-protected lamp; that is to say, a lamp provided with a wire-gauze chimney of approved construction and in which all openings for the admission of air to the lamp are covered with wire gauze to prevent the passage of flame from within the lamp to the outside atmosphere.

Ques.—How is a safety lamp constructed, and for what purpose is it used?

Ans.—There are two general classes of safety lamps, designed respectively for testing for gas and for working at the face. The favorite lamp for testing for gas has always been the unbonneted Davy. This lamp consists of an oil vessel surmounted by a wire-gauze chimney about 1½ in. in diameter and from 4 to 4½ in. in height. The standard wire gauze is composed of a mesh of 28 wires to the inch and contains 784 openings per square inch. The gauze chimney is secured firmly to the oil vessel and is surmounted by a gauze cap or "smoke gauze" as it is commonly called, its purpose being to give added protection at the top of the chimney where there is the greatest danger of the lamp passing flame.

The safety lamp designed for work at the face is provided with a glass chimney, which surrounds the flame and is surmounted by a shorter gauze chimney that is generally of a slightly conical shape. The gauze chimney may or may not be provided with a metal shield called a "bonnet." This form of working lamp, known as the Clanny type, is shown in the accompanying figure. The glass chimney affords a better light for the workmen and gives an added protection against strong air currents. The lamp, however, is not as sensitive to gas as the Davy, which has an entire gauze chimney.

BONNETED CLANNY

The purpose of the safety lamp is to permit men to work with safety in an atmosphere containing an inflammable mixture of gas and air in which an open light would be dangerous. When a safety lamp is introduced into a body of gas, the gas-charged air entering the lamp will burn within the chimney, but the flame will be prevented from passing through the gauze by the cool metal. The small streamlets of gas passing outward through the mesh of the gauze become cooled below the point of ignition of the gas, so that the flame is extinguished.

Ques.—When is a safety lamp unsafe?

Ans.—A safety lamp is unsafe when handled by an inexperienced person, or in a careless manner, or when the lamp is exposed for too long a time to an inflammable atmosphere. The gauze of the lamp then becomes sufficiently heated to allow the passage of flame through the mesh of the gauze.

Book Reviews

Electrical Engineers' Handbook

STANDARD HANDBOOK FOR ELECTRICAL ENGINEERS, Prepared by a Staff of Specialists. Frank F. Fowle, Editor-in-Chief. McGraw-Hill Book Co., Inc., 239 West 39th St., New York City. Leather, 4¼x6¾ in. pp. xvi + 1916 + an index of 68 pp. Several illustrations. Fourth Edition. $5, net.

Prof. T. Hudson Beare, of University College, London, believed in the use of textbooks in examinations and used to say that there were two essentials of an engineer's education—to know where to find things and to know how to use them when found. For electrical engineers this handbook removes the first difficulty. The expert must still, as always, overcome the second by his own experience and native ability.

To make the book easy of reference there is not only an excellent index, but also in the covers is a separate general numbered classification of the subjects contained, the numbers being placed in thumbholes on the margin of the book as the letters of the alphabet are disposed on the edge of a dictionary. This makes it easy to refer to any subject.

Thus section No. 1 devotes 151 pp. to "Units, Conversion Factors and Tables." It is written by Arthur E. Kennelly, professor of electrical engineering, Harvard University and Massachusetts Institute of Technology. Section No. 2 is on "Electric and Magnetic Circuits" and is written by Vladimir Karapetoff, professor of electric engineering, Cornell University. Some of the sections have many authors where the information contained in them is of a specialized nature and is not part of the common practice and use of the whole profession. Thus "Miscellaneous Applications of Electricity" has no less than 12 contributing editors.

The "Standardization Rules of the American Institute of Electrical Engineers" forms one section and "General-Engineering Economics and Central-Station Economics" another. In the latter the reader will find much to instruct him as to the many methods of determining the load factor for central-station charges. The purchaser of power from public-service corporations to operate his mines should be well posted as to the nature of such contracts.

The subject of "Coal- and Ore-Handling Machinery" falls to C. D. Gilpin, electrical engineer for the Wellman-Seaver-Morgan Co. Graham Bright, engineer of the mining department, Westinghouse Electric and Manufacturing Co., writes briefly (6½ pp.) on "Coal Mining." There is, of course, but little about the application of electricity to coal transportation and production. It has more, however, than Trautwine or Kent, which are reference books of like character. Yet no mining engineer can afford to be without either of these, and he will do well to provide himself with this book, which perhaps we may name "Fowle," though the editor-in-chief modestly refrains from giving his name such publicity, realizing that he is rather the assembler of the parts than the mechanician who constructed them.

The coal-mine operator will read and refer with interest to the sections on "Direct-Current Generators and Motors," "Alternating-Current Generators and Motors," "Converters and Double-Current Generators," "Power Plants," "Power Transmission," "Distribution Systems" and "Batteries."

The reader who has Trautwine and Kent is apt to fear that in getting an electrical manual he will be purchasing a large amount of material in duplication of what appears in those books, but if he should invest in Fowle he will find he has a book closely confined to its exclusive field, the exception being 110 pages on power plants. There are only eight pages in all given to natural sines and cosines, logarithms and hyperbolic logarithms. Because a few people are ill-equipped with tables in easily portable form every engineering author seems to delight in adding to his book a series of tables which are all very useful in their way, but are useless and "in the way" most of the time. Our eight-foot book shelves of engineering classics might be trimmed over a foot if redundancies such as these were eliminated.

Another unfortunate tendency is to teach in such textbooks mathematics, elementary and advanced, chemistry, mechanics and physics. As a result, such treatises are so extensive in scope that no attempt can be made to make them complete. Mr. Fowle avoids this fault admirably, and the book will stand the closest inspection.

A Directory of Coal Operators and the Supply Trade

THE COAL FIELD DIRECTORY AND MINING CATALOGS OF COAL MINING EQUIPMENT FOR THE YEAR 1915. Second Edition. Keystone Consolidated Publishing Co., Inc., 6th floor, House Building, Pittsburgh, Penn. Cloth boards, 9x12½ in.; 656 pp. illustrated.

This directory of operating companies and of the concerns supplying their wants meets the needs of both parties and has a hearty welcome from the public. It was the intention of the reviewer to refrain from praise this year because last year he stated, "In it [the Coal Field Directory] is added an exceptionally valuable addition of 17 pages, cataloging mines by counties, so that traveling men and managers who wish to district their work will receive no little assistance in so doing."

It seemed a risky matter to applaud anything in the book because what was singled out for express approval last year was for some reason omitted in the present edition. But it appears that in future issues this valuable adjunct will not be omitted. It serves several purposes. Granted that we know the town and county in which an operation is located, it is easily possible in that department of the book to find the names of all the concerns operating in that place and by a process of elimination to ascertain the firm regarding which information is wanted.

It is sometimes necessary to find all the concerns mining coal in a certain field, and even the state mine reports which are almost always based on districts of inspection are far less available than the "Blue Book." So the reviewer trusts this important feature will be restored in 1916. He will undertake not to charm it away by needless praise. Regret must also be expressed that the authors have seen fit to eliminate the list of inspectors formerly printed on the last page of the book. Nowhere else was such a complete list of these public functionaries obtainable.

The book has almost 92 more pages than last year. The catalog material is more complete than ever, and the selection of information in this part of the volume is good. As the matter is of an encyclopedic character it is well-suited for reference. If a beginner were asked where to find information about mining machinery and equipment, he might well be recommended to peruse the directory, so closely does it approximate to a textbook in its manner of presentation; and to complete the resemblance, several pages of nonadvertising free information have been added by the manufacturers. It has been rightly said there are few people who know machinery and equipment better than the man who makes them.

The Coal Field Directory is remarkably complete. Fewer and fewer companies are withholding information. If the company's directing heads and manner of operation are not given, it is almost an infallible sign that its affairs are not worth chronicling. In small, condensed type without unnecessary syllables we find the names of the operating and store company, the president, treasurer, secretary, vice-president, general manager, purchasing agent, general superintendent, mining engineer, mine superintendent, mine foreman, consulting engineer, electrical engineer, master mechanic and store manager, with their addresses. The name of the mine, its freight station or stations, the railroad or railroads reaching the town, the county, the system of hauling and of mining, the number of boilers used, their rating and type, and the number of employees and coke ovens, details as to the pumps installed and the generating units, the voltage of the current, the number of air compressors and the tonnage last year are all given. It is really a remarkable compendium of mining information.

The reviewer trusts that in coming editions this useful book will develop rather than decrease its cross-indexing. When the last stage of completeness is reached, the mining officials will be indexed so that their affiliations may be readily traced. An important man is often better known than his company connection, and it is frequently useful to be able to trace the points where men of lesser importance are to be found. An index of officials which will enable the public to do this will be of much value to mine operators, especially if such a list is accompanied by the addresses of the persons listed so as to form a personal directory.

Coal and Coke News

Harrisburg, Penn.

The recent announcement by Chairman Robert K. Young, of the State Workmen's Insurance Fund, that the rates would be 10 per cent. less than the approved rates in the insurance rate manual and that $5 would be the minimum premium is the beginning of the state's campaign in behalf of the fund for liability insurance.

In connection with this general announcement, the Board issues the following explanatory remarks.

The announcement of this approved rate reduction of 10 per cent. on all rates is a matter of much interest and concerns all employers of labor in the State of Pennsylvania.

The law creating the fund requires that the premium rate shall be fixed at the lowest amount consistent with the maintenance of a solvent fund and the creating of an adequate surplus and reserve. The fund pays no commissions or agents and does not have to earn profits for stockholders, and for the first three and one-half years the entire expenses of the management are paid by the state. The elimination of these expenses is sufficient to allow the board to write insurance at this reduced original rate. The balance remaining which may be applicable on the basis of an average experience also gives every prospect of returning a very substantial rebate in dividends to subscribers at the end of the year so as to bring the cost of the insurance in the state down to a much lower basis.

They may obtain their compensation insurance in the state at a rate lower than that charged by the stock and mutual companies, and also will receive the benefit of aditional advantages which cannot be obtained by other forms of insurance. Employers insuring in the state fund can obtain a complete release of their personal liability and full protection of their property against compensation liens. If the subscriber to the fund makes the report of an accident within 7 days, his liability ceases and is transferred automatically to the fund, so that no valid lien can be filed against the property of an employer insuring in it. Every other form of insurance leaves the employer personally liable, so that every agreement or award of compensation may be entered as a lient against his real estate wherever situated within the state, and this lien cannot be discharged until the whole compensation agreed upon or awarded has been paid in full. In serious cases this compensation will run for a number of years, during which period the lien must remain as a cloud upon the employer's property.

There is also an advantage to subscribers in the state fund that there will be no contingent liability to assessments to which all employers insuring in mutual associations are subject. The purpose of the act was to make the payment of the premium the sole liability to subscribers, and no assessment will be levied in any case, as there is not one word in the act creating the state fund that directly gives or by implication suggests the right of assessment.

The state fund will provide insurance at net cost, and by the elimination of the operating expenses which other companies must pay out of their premiums it is reasonable to assume that the state can furnish complete protection under the new law at a price below that of other insurance.

In the announcement of $5 as the minimum premium the board has solved the problem which has been confronting the small employer with one, two or less than five employees engaged in occupations of a minor hazard. This amount was decided upon as an attractive inducement to the small employer to insure in the state fund, as it was apparent that it would be necessary to issue the insurance for the small employer at a price which would not burden him. The employer will have the same complete protection and release from liability as the regular policy, and it is intended to encourage the acceptance of the workmen's compensation act by the employers whose estimated payroll is of an amount where the individual classifications are not computable at a rate which would exceed the minimum figure. It is probable that this minimum adopted by the state fund is less than the other companies will desire to issue policies to employers who would come within the minimum limits.

Petition for Re-argument

Attorney-General Brown recently, filed a petition in the State Supreme Court asking for a re-argument in the anthracite coal tax case. The Court recently decided that the law of 1913, levying a tax on hard coal was unconstitutional. Eleven reasons are given for another review, among them being that the opinion of the Supreme Court is "contrary to all precedent in Pennsylvania, because it is the first time in the history of the jurisprudence of the state that classification for the purpose of taxation has not been sustained"; and that it "is the first time in the history of Pennsylvania, or elsewhere in the United States, so far as counsel are advised, that where a classification has been sustained for one purpose the same classification has not been sustained for purposes of taxation."

The logic of the opinion of the Court the petition further says, "that there is no reason for taxation, because 40 per cent. of anthracite coal is in competition with bituminous," will lead to a denial of the right to classify coal, oil and other fuel for taxation because it comes into competition with coal.

With regard to the distribution of the tax which the supreme court declared contrary to the constitution, the petition says: "Even if it be true that the provision for partial distribution among counties is unconstitutional that furnishes no reason for striking down the tax. The two matters are so separate and distinct that the tax may be sustained though the distribution provided for be forbidden."

The offer of the Philadelphia & Reading Coal and Iron Co. and other smaller firms to refund to the wholesalers money they collected as state tax on anthracite will be opposed by the state authorities, it is said here.

The filing of the information in escheat with the Auditor-General of the state by an attache of that department prevents any one benefitting from collections of the alleged "unclaimed fund."

In many instances the coal operators sold coal to wholesalers with the exact amount due because of the tax set forth on their bills. These companies will have no trouble in determining what amount should be paid over. The state's interest in the matter will go further, as Auditor-General Powell will compell the wholesalers to show that they have returned the money to their customers.

PENNSYLVANIA

Anthracite

Lansford—A. Carl Neumiller, chief forester for the Lehigh Coal and Navigation Co. is planting one shade tree in front of each dwelling owned by the company in this town.

Sunbury—Coal in the Susquehanna River, between here and Nanticoke, is virtually exhausted for this year. Fifty thousand tons were removed last summer.

Girardville—The McTurk Colliery, operated by the McTurk Coal Mining Co., has resumed operations, giving employment to hundreds of men and boys.

Tamaqua—As the result of a button strike 2,000 miners in the collieries of the Lehigh Coal and Navigation Co. in the Panther Creek Valley were recently thrown out of work.

Summit Hill—At the present time the Lehigh Coal and Navigation Co. has 7 mine locomotives and 3 steam shovels in constant operation in its endeavor to stop the 60-year old fire in the coal deposit of this district. A cut over 200 ft. deep is being made under the lower level and it is the intention to use this opening to drive the fire to the surface with air currents, while extensive sluicing operations are continuing from the top. It is the intention of the company to expend if necessary $1,000,000 in order to quench the fire for all time.

Hazleton—In the course of stripping operations near the Honey Brook No. 1 colliery of the Lehigh & Wilkes-Barre Coal Co. the deposit was found to be on fire. This is believed to be a continuation of a fire which was thought to have been extinguished in 1880. In order to extinguish the fire a pipe line over a half mile in length has been laid, which will carry a slush mixture of ashes, culm and dirt.

Lykens—Old timber in the lower gangway of the Short Mountain Colliery recently caught fire in some unknown manner and was extinguished only after three days and nights of continuous labor. Operations at this colliery have been resumed.

Bituminous

Connellsville—Religious holidays, carefully observed in the coke region by foreign workers, cut down coke production recently in spite of the fact that 400 ovens, which had been idle for a long time, were again placed in operation. The 31,000 active ovens have a weekly capacity of approximately 450,000 tons, if properly speeded up. Merchant operators have 80 per cent. of their ovens in use, while the furnace interests without the recent addition of idle ovens, are operating to 81 per cent. of their capacity.

Central City—A shortage of miners is causing much trouble for the coal operators in this vicinity as well as Cairnbrook. The Lochrie mines are especially hampered because of the shortage of men. The Pennsylvania R.R. is to

extend its line from Cairnbrook into the coal fields here. Much activity is expected in these new fields in the spring and it is realized that better shipping facilities will be necessary.

Uniontown—Announcement has been made that J. Blair Kennerly, of Philadelphia, has taken a 15-year lease on the Ansbach coal mining property located on the Whites Creek Branch, about four miles above Confluence, Somerset County. The lease was obtained from the Girard Trust Co., of Philadelphia, trustee for the Fred J. Ansbach estate, with all the improvements on the mine. The lease became effective Nov. 1. Work of mining will begin about Nov. 22 and will give employment to about 75 men. The mine contains a 4.5- to 5-ft. vein of C prime coal and the production is expected to average about 800 tons a day. The tract includes 550 acres. The mine, which has been idle for a year and a half, is self draining and is equipped with electric haulage and coal cutting machinery. Two additional side tracks and a shaker screen are being installed.

WEST VIRGINIA

Bluefield—Every available car of the Virginia & Southwestern, the Carolina, Clinchfield & Ohio, and the Norfolk & Western railways are apparently busy all the time, and an immense tonnage of coal is being moved to market. Many coke ovens throughout the nearby field have been lighted after long periods of idleness.

Huntington—A coal deal of considerable magnitude was recently closed in this city when the Mason Coal and Coke Co. sold a large tract of mineral land to the Cumberland Mountain Coal Co. of Charleston. The exact consideration in this deal has not been named, but it is understood to be in the neighborhood of $100,000. The coal land in question consists of 13,000 acres in Buchanan County, Va., and is tributary to the Norfolk & Western R.R.

Fairmont—The old Pierpont mine is blamed for the sinking of buildings, water lines and sewer pipes in this city. New brick buildings erected within a year have been ruined. A similar occurrence took place some years ago in another part of the town. This has now apparently reached a state of stability, and the buildings then damaged are being rebuilt.

The shaft to the coal in the Carolina mine of the Consolidation Coal Co. has been completed at 500 ft. The shaft at the Idamay mine is also nearing completion, and is expected to be finished at 480 ft. Loading is expected to begin at both of these mines by Jan. 1, and shipments will be made over the Baltimore & Ohio to the Western Maryland.

Dola—Practically all of the coal mines in the vicinity of Dola are running full time; even those which have been closed down for several months have resumed operations and old employees are back at work.

ALABAMA

Birmingham—A contract has been offered the State of Alabama by the Sloss-Sheffield Steel and Iron Co. for the use of state convicts to be worked in the Flat Top mines. This company is giving up the use of county convicts, but wishes to employ between 350 and 400 state convicts in the mining of coal and between 50 and 75 in keeping up the mines, the full number to be between 400 and 500 men.

TENNESSEE

Turley—The Turley Coal Co., R. O. Howard, Atlanta, Ga., president, has been placed in the hands of a receiver. The mine has been closed down and the property is for sale. The Central Bank and Trust Co. of Atlanta, Ga., holder of the first mortgage bonds, is the receiver.

KENTUCKY

Typo—A party of officials of the Louisville & Nashville R.R. recently went over the First Creek branch out from Typo through the First Creek coal field to determine whether to begin hauling coal from the different plants there, most of which are in readiness to begin shipping. Within two weeks shipments will start.

Hazard—The Blue Grass Coal Co. near here makes the announcement that it will be ready to start shipments from its new plant by Nov. 25. Mining work will be started within the next few days.

Barbourville—All the mines in the Cumberland Valley are now working full time and a good proportion of them are working night shifts. A full run through the winter is expected by the trade.

Whitesburg—Small operators of the Big Sandy territory and its tributaries east of here continue to complain of a car shortage and are said, in many instances, to be suffering from lack of cars. From the railroads, however, it is promised that plenty of cars will be supplied in the near future.

OHIO

Columbus—Ohio operators are almost unanimously opposed to reviving the interstate conference agreement in dealing with the wage question when it comes up for settlement after Apr. 1, 1916. The interstate conference agreement consisted of Ohio, Western Pennsylvania, Indiana and Illinois and had been in force for several years previous to the 1914 agreement. An informal meeting was held in Columbus recently when the question of reviving the interstate conference agreement was discussed. Letters were then sent out to oprators asking their views. Almost without exception operators believe that Ohio should treat with the miners' organization single handed.

INDIANA

Linton—Local capitalists interested in the strip mining industry have taken options on several hundred acres near Clark Station, 3 miles south of here.

Terre Haute—Dr. August F. Knoefel, of this city, has been in Washington to ask the bureau of mines to make further investigation into the mining industry of Indiana and to make an increase in government rescue equipment in the state. There is only one mine rescue car in Indiana. It is now in the Linton field.

ILLINOIS

Springfield—President Frank Farrington, of the United Mine Workers of Illinois, has issued a statement that union miners may belong to the state militia and directing that no man is to be expelled from the union because he is a member of the national guard. The announcement is the result of trouble recently at Hillsboro over the suspension of union miners for belonging to the militia.

New Baden—The miners employed at the New Baden Mine of the Southern Coal, Coke and Mining Co., after being on strike for a week, have returned to work on practically the same conditions as prevailed before the strike. The dispute was as to cars of coal that were run through without being weighed. The practice has been, when this occurred, to take the average weight of the cars sent up by the particular miner for the day and make allowance on that basis for the one that was not weighed. The miners objected to this method. After a conference of miners' officials with the company it was promised that a defective condition of the hoppers which prevented the weighing of all cars would be corrected as soon as possible, so that all coal could be weighed.

IOWA

Eldora—A new coal field has been discovered north of Eldora, Ia., and the coal is of sufficient thickness to permit of profitable working, it is said. Drilling has been in progress for several weeks and those in charge say that coal in workable measure underlies considerable territory north of Eldora, although the extent of the field has not been determined.

Des Moines—One of the first aid cars of the bureau of mines will arrive in Des Moines Nov. 21 and remain until Dec. 8. Notices have been posted at all coal mines in Iowa and northern Missouri. J. J. Forbes, in charge, will give first aid instructions. In addition to the miners it is expected factories and wholesale houses will send representatives. As the Des Moines field is large, Mr. Forbes will utilize the lecture rooms of the new Iowa Industrial Hospital in making demonstrations.

WYOMING

Frontier—Mine Rescue Car No. 5 of the United States Bureau of Mines, will be in Frontier from Nov. 14 until Dec. 4. Free lectures will be given to miners on safe methods of mining and the use of safety lamps and rescue apparatus will be explained. Miners will also be trained in rescue and first aid. Moving pictures will be exhibited showing good and bad methods of mining.

FOREIGN NEWS

London, England—Official notice was recently posted in all collieries stating that such a large number of miners have already joined the army that "the supply of coal which is of vital national interest is seriously affected." Coal miners will hereafter be accepted as recruits only on condition that they will continue to work in the mines until called upon. "The miners must one and all remember," the notice continues, "that upon their efforts the success of the country depends, no less than upon the men who are serving with the forces."

PERSONALS

D. P. Cary recently resigned from the presidency of the Lorain Coal & Dock Co. S. W. Braggins, sales manager, will act as president of this firm until a successor is named by the board of directors.

Frank A. Vanderlip has taken a position on the board of directors of the S. K. F. Ball Bearing Co. of Hartford, Conn. This firm has a paid up capital of $2,000,000 and will shortly erect a factory in Hartford.

J. D. Mooney has been appointed sales manager of the Commercial Department of the Hyatt Roller Bearing Co. In the past Mr. Mooney has been in charge of belting sales for the B. F. Goodrich Co., Akron, Ohio.

Harvey H. Morris, assistant superintendent of the Huntington & Big Sandy division of the Chesapeake & Ohio R.R., and one of the veteran officials of the system, recently tendered his resignation in order to become general manager of the West Virginia Standard Coal Co. This company was organized by Mr. Morris, and will have its general offices in Huntington.

William J. Jones, of Akron, N. Y., former mine and quarry inspector for the state and later state inspector of explosives in the State Fire Marshal's Department, has been appointed superintendent for the Berlin Smokeless Coal and Clay Mining Co. This firm will develop several hundred acres of coal and clay land in the vicinity of Macdonaldton, Somerset County, Penn.

W. F. Hyde has been employed by the West Virginia-Pittsburgh Coal Co. as a welfare expert and will devote a portion of his time to the employees of the company at Collier and Wellsburg. Mr. Hyde has been in charge of welfare work at Wheeling for several years, and is known locally and nationally for his community and welfare work. He will also do similar work among the employees of the Richland Coal Co., and the Hitchman Coal and Coke Co., of Wheeling.

OBITUARY

John Kennedy, of Pricedale, Penn., one of the oldest and best known mine foremen with the Pittsburg Coal Co., died recently at his home in Pricedale. Mr. Kennedy was 55 years of age and is survived by his wife, three sons, and three daughters.

RECENT COAL AND COKE PATENTS

Underfeed Furnace. R. S. Riley, Providence, R. I. 1,148,625 Aug. 3, 1915. Filed Oct. 20, 1911. Serial No. 655,822.

Gas Producer. W. O. Amsler, Pittsburgh, Penn. 1,149,611 Aug. 10, 1915. Filed Oct. 3, 1911. Serial No. 652,529.

Mining Machine. C. O. Palmer, Cleveland, Ohio. 1,149,215 Aug. 11, 1915. Filed Mar. 11, 1909. Serial No. 482,750.

Mining Machine. L. F. Hess, Ansted, W. Va. 1,147,724 July 27, 1915. Filed Nov. 21, 1914. Serial No. 873,313.

Coke Conveyor. D. F. Lepley, Connellsville, Penn. 1,142,895, June 15, 1915. Filed Sept. 18, 1914. Serial No. 862,392.

Gas Producer. P. G. Schmidt, Olympia, Wash. 1,142,914, June 15, 1915. Filed Mar. 29, 1913. Serial No. 757,671.

Mechanical Stoker. G. B. Rait, Minneapolis, Minn. 1,149,685 Aug. 10, 1915. Filed Apr. 10, 1914. Serial No. 830,878.

Apparatus for Separating Coal. F. Pardee, Hazleton, Penn. 1,149,463 Aug. 10, 1915. Filed May 2, 1913. Serial No. 765,170.

Pulverized Coal Burner. N. L. Warford, Anaconda, Mont. 1,147,833 July 27, 1915. Filed Dec 5, 1914. Serial No. 875,665.

Gas Producer for Furnaces. W. O. Houston, Bellaire, Ohio. 1,149,056 Aug. 3, 1915. Filed Feb. 9, 1914. Serial No. 817,384.

Mechanical Stoker for Locomotive. E. Young, Pony Lake, Neb. 1,148,735 Aug. 3, 1915. Filed Oct. 25, 1913. Serial No. 797,226.

Mechanical Fuel Feeding Apparatus. I. Stordahl, Miles City, Mont. 1,144,156, June 22, 1915. Filed Feb. 8, 1915. Serial No. 6949.

Fuel Saving Attachment for Furnaces. N. J. Russell, Chicago, Ill. 1,150,456 Aug. 17, 1915. Filed Mar. 12, 1915. Serial No. 14,018.

Mining Machine. H. A. Kuhn and W. W. Macfarren, Pittsburgh, Penn. 1,148,973 Aug. 3, 1915. Filed Jan. 2, 1909. Serial No. 470,292.

Mining Machine. C. E. Davis, assignor to Goodman Mfg. Co., Chicago, Ill. 1,149,502 Aug. 10, 1915. Filed Jan. 13, 1911. Serial No. 602,386.

Mining Machine. L. F. Hess, assignor to Hess Dustless Mining Machine Co. 1,143,599, June 15, 1915. Filed Mar. 26, 1912. Serial No. 686,287.

Mining Machine. F. L. Sessions, assignor to Jeffrey Mfg. Co., Columbus, Ohio. 1,143,144, June 15, 1915. Filed Feb. 16, 1909. Serial No. 478,201.

Automatic Releasing Device for Cars upon Mining Cages. S. Galli, Mulberry, Kan. 1,150,819 Aug. 17, 1915. Filed Jan. 21, 1915. Serial No. 3555.

Boiler Construction. W. F. Sellers, assignor to Edge Moor Iron Co., Edge Moor, Del. 1,148,544 Aug. 3, 1915. Filed Nov. 25, 1914. Serial No. 873,851.

Mine Car Wheel. H. A. Holzer, assignor to United Iron Works, Springfield, Mo. 1,144,302, June 22, 1915. Filed Apr. 5, 1915. Serial No. 19,267.

Boiler Furnace. C. H. Schroder, assignor to Murray Iron Works, Burlington, Iowa. 1,141,127. Aug. 24, 1915. Filed Feb. 3, 1915. Serial No. 5920.

Smoke Prevention Apparatus for Furnaces. W. Williams, Glebe, New South Wales, Aust. 1,148,421 July 27, 1915. Filed Nov. 4, 1913. Serial No. 799,194.

Manufacture of Coal Briquettes. H. J. Phillips, assignor to Pure Coal Briquetters, Ltd., Cardiff, Wales. 1,149,536 Aug. 10, 1915. Filed Jan. 31, 1914. Serial No. 815,688.

INDUSTRIAL NEWS

Philadelphia, Penn.—Lloyd's, England, have posted as missing the steamer "Linda Fell," which left this port on Sept. 29 with a cargo of 2,720 tons of coal for Cienfuegos, Cuba.

Ottawa, Ill.—On and after Nov. 15, 1915, the offices of the St. Paul Coal Co. will be located at 1368 Fullerton Ave., Chicago. The old offices were at 306 Central Life Bldg., Ottawa, Ill.

Harlan, Ky.—The Harlan Coal Mining Co. with mines at Coxton and Kayu has constructed 25 additional miners houses and plans to add more at Coxton, in preparation for more extensive mining operations.

McAlester, Okla.—Faires Coal Mining Co. has been incorporated at Oakland City with a capital of $1,000 for the purpose of coal mining. The directors are H. C. Faries, Onie Faries and William T. Fleener.

New Straitsville, Ohio—The Wm. J. Miller Coal Co. has been incorporated with a capital of $5,000 to mine coal. The incorporators are Wm. J. Miller, Herbert Minshull, George Hite, Harry Leake and Frank Davis.

Philadelphia, Penn.—Bituminous tonnage carried by the Philadelphia & Reading Ry. during September amounted to 1,488,917 tons as compared with 1,347,439 tons last year, and 1,521,727 in August of the present year.

Knoxville, Tenn.—The Southern Ry., which recently completed the coal handling terminals at Charleston, S. C., has had a moving picture film made of the work and is showing the picture in theatres in this section.

Bellaire, Ohio—The Johnson Brothers Coal Co. has been incorporated with a capital of $25,000 to mine coal. The incorporators are J. F. Johnson, J. F. Johnson, Jr., Elizabeth Johnson, Joseph E. Poorman, Bessie Poorman.

Ironton, Ohio—The Ironton Engine Co. has begun the manufacture of a new type of electric mine locomotive, operated by a storage battery, and possessing original features of considerable value, it is understood.

Charleston, W. Va.—J. W. Dawson recently purchased at public auction the plant of the Hughes Creek Coal Co. at Hughestown for $3,000. The estimated value of this property was $25,000. It was sold by James Kay, receiver.

Pittsburgh, Penn.—Youngwood Coal and Coke Co. has been incorporated to drill for oil, gas, clay and other like mineral products. Capital, $150,000. Incorporators, C. W. Fulp, H. S. Sterling, A. W. McCoy, all of Pittsburgh, Penn.

Washington, D. C.—Anthracite coal operators of Pennsylvania have petitioned the Interstate Commerce Commission to reopen the rate case in which they asked for lower rates on coal shipped from the Wyoming region to tidewater for trans-shipment.

Beckley, W. Va.—Prince E. Lilly recently purchased from W. W. Hume, R. D. Roller and G. C. Hedrick, 100 acres of coal land near the junction of Stone Coal and Pine Creeks, about four miles from Odd. It is said that $20,000 was paid for this property.

Pittsburgh, Penn.—The 80th birthday of Andrew Carnegie and the 15th anniversary of the founding of the Carnegie Institute of Technology will be celebrated by appropriate exercises at the Institute on Nov. 23 and 24, 1915. An address will be delivered by Henry F. Pritchett.

Whitesburg, Ky.—The Funk Coal Co. organized by H. H. Funk and others is opening a coal development on the Chesapeake & Ohio's Big Sandy extension near Pikeville. This will have a daily capacity of about 1,000 tons to start with. The company will ship from Ward Siding.

Ashland, Ky.—Thomas Adams, president of the Norton Iron Works, is understood to have bought a 28-acre site on which to build a coke and coal by-product plant, to reach a cost of $200,000, to supply coke to the iron works. The plans of the concern, however, are declared to be indefinite.

Camden, N. J.—Three new steamers of about 5,500 tons gross register are about completed at the plant of the New York Shipbuilding Co., which vessels it is understood will be put into the Virginia coal trade as soon as finished. These boats are the "Jonancy," "Virginia" and "Bylayl."

Richmond, Mo.—The Hubbell-Hamilton Coal Co., of Richmond, Ray County, has been organized with a capital stock of $2,400. The incorporators are Clarence H. Hubbell, Robert L. Hamilton, and George W. Hunt. The organization is for the purpose of owning, operating and developing coal mines in Ray County.

Harlan, Ky.—The Creech Coal Co., recently organized in Bell County with $200,000 capital, will develop a mine on the headwaters of Wallins Creek in Harlan County with two openings and proseses a 40-ton daily output at the outset. Work has already been started and a number of miner's houses have been built.

Knoxville, Tenn.—An informal meeting of the Southern Appalachian Coal Operators' Association was held in this city on Saturday, Nov. 13, at which the market situation was considered at considerable length. A good deal of consideration, it is stated, was given to the possibilities of export of coal from the Tennessee-Kentucky field via Charleston, S. C.

Praise, Ky.—D. D. Cox, of Castlewood, Va., has been elected president of the Superior Coal Co., which recently incorporated and which will develop a 300 acre boundary. The capital stock is $50,000 and the other officers are C. W. Boyd, Richlands, Va., vice-president; Frank G. Craig, secretary-treasurer and S. R. Johnson, of Praise, is constructing engineer.

Washington, D. C.—Tariffs of the Southern Ry increasing coal rates from mines at Belleville and other Illinois towns to Kansas City and points on the Chicago & Alton R.R. in Missouri were suspended recently by the Interstate Commerce Commission until Mar. 14. The present rate from Belleville to Kansas City is $1.90 per ton, and the proposed rate is $2.15.

Middlesboro, Ky.—Two and a half miles of the Wallins Creek extension of the Louisville & Nashville R.R. is completed and the contractor has the remaining three miles partly graded. Forty teams are at work and the early part of January is expected to see the branch in operation. This extension opens a large area of some of the best coal land in Harlan county.

Buffalo, N. Y.—The barge "P. D. Armour," owned and sailed by Capt. Joseph A. Boland, of this city, went on the peninsula at Erie, Penn., on the night of Nov. 12 with a cargo of 2,200 tons of bituminous coal, loaded at Ashtabula, Ohio, for Welland, Ont. Both vessel and cargo will be lost. The crew of the barge and of the tug towing it were saved with difficulty, as a gale was blowing.

Bluefield, W. Va.—The Clinchfield Navigation Co. is about to put a new steamer into commission. This vessel was recently completed at a shipyard on the Great Lakes and is now on its way to the Atlantic where it will be used in the coastwise trade, chiefly between Charleston, S. C., and gulf ports. The new vessel, which has not yet been named, has a cargo capacity of about 3,000 tons.

Scranton, Penn.—As the result of complaints entered by the city of Scranton claiming the local rates of freight on anthracite coal from the mines to the cities and towns hereabouts were excessive, the Public Service Commission has ordered a reduction. In some cases the change amounts to as much as 49% and on an average amounts to 27%. The new rates are to become effective Dec. 11.

Whitesburg, Ky.—A party of Pennsylvania and other Eastern capitalists is making a tour of the Shelby Creek-Long Fork and Beefhide sections of the Letcher-Pike border east of here with the purpose of leasing for development a large boundary of coal lands lying along the new line of the Baltimore & Ohio R.R. It is stated that things will be in readiness to start the development work by the first of the new year.

Baltimore, Md.—For years the anthracite tonnage of the Baltimore & Ohio R.R. to this city has been growing less and less owing to poor coal yard facilities on the company's tracks here. To overcome this difficulty the company recently erected several large and up-to-date coal pockets on Huntingdon Avenue, which have now been occupied by dealers. It is the intention of the Baltimore & Ohio to erect additional retail yards on its tracks and lease them to dealers.

Whitesburg, Ky.—It is stated here that preparations are being made by the Chesapeake & Ohio R.R. Co. to build a 15-mi. branch up the right fork of Beaver Creek, on the Knott-Floyd county line. The rights-of-way for construction of the branch were obtained some time ago it is said. A number of firms, including the Elkhorn Mining Corporation, hold mineral rights in that section and are said to plan large operations. This is one of the richest undeveloped fields in Eastern Kentucky.

Pottsville, Penn.—According to information given out by President W. J. Richards, of the Philadelphia & Reading Coal and Iron Co., that firm is already prepared to refund to its customers the state tax collected by the company under the act of 1913. This, it is stated, will be done immediately upon being assured by the legal department that the state will make no further effort to collect the tax. In the event of this failing the money will then be turned back to the purchasers of the coal.

Birmingham, Ala.—The Tennessee Coal, Iron and Railroad Co. is preparing to open two new mines on the Woodstock coal bed near Blocton, Ala., about 40 miles south of Birmingham. These mines will replace those in the Thompson seam on the same division, which are being rapidly exhausted, and are now decreasing in output. Some of the equipment at the present mine will be reused at the new operation, mining machines being added, none being at present in use in the old mines on this division.

Monongahela, Penn.—The best coal shipments for any one month since October, 1913, were reported for October of the current year by Lockmaster George W. Paxton at Lock No. 4. The shipments during October of this year totaled 19,819,000 bu. In October, 1913, 19,933,000 bu. were locked through. All shipments at Lock No. 4 are now being made through the newly-built lock, while the rebuilding of the inner lock is in progress. The government forces engaged on this construction are sadly in need of additional workmen.

Great Falls, Mont.—Pearce Coal Co. has been incorporated here with a capital of $50,000. The articles of incorporation state that the object of the company is to purchase, lease, or otherwise acquire coal lands, and open and operate mines, as well as to engage in the kindred activities that accompany such labors. The headquarters of the company will be at Sand Coulee, Mont. Of the stock, $27,500 has been subscribed by John N. Pearce, of Sand Coulee, Charles Lochray, of Great Falls and Dominic Spogen, of Belt, who incorporated the company.

Blackfield, Penn.—A number of improvements are to be made by the Sonman Coal Co. The output of the plant will be almost doubled by the change. An inclined plane will be used in disposing of the rock taken from the shaft and this will enable the company to greatly increase its capacity for mining coal. A new office building is also being erected.

Black Brothers Coal Company operating here is soon to open another mine and to make improvements at its new plant. This will bring about the hiring of about 100 more miners.

State College, Penn.—In the presence of Governor Brumbaugh, the new mining engineering building of Pennsylvania State College was recently dedicated. The address of dedication was delivered by H. M. Chance, of Philadelphia. The building is three stories in height and contains a valuable collection of working mine models on the third floor, with larger exhibits on the first floor. The remainder of the space is devoted to class-rooms. On the day of dedication the students gave an exhibition of mine rescue work. The entire cost of the building was $50,000.

Coal Trade Reviews

General Review

Anthracite trade satisfactory but less active than anticipated. Reactionary tendency in bituminous though prices are steady. Decline in exports continues. Uncertainties in the Lake markets. Colder weather stimulates buying in the Middle West.

Anthracite—The hard-coal trade is backing and filling pending the arrival of lower temperatures. The situation is generally satisfactory, but there is no pressure for shipments such as is to be anticipated at this period. A few sizes are in short supply, but occasional concessions are noted on other grades where forced sales are made. The general tendency among retailers to file orders well in advance has done much to relieve a reactionary tendency in the market. Possibility of labor troubles in the early spring is also tending to shake out numerous protective orders. Collections are excellent, dealers becoming anxious about their credit position with the large companies whom they will look to for protection in the event of any serious scarcity after Apr. 1. Lake shipments are on a larger scale despite increased freight rates, the arrivals for the season to date at the upper Lake ports being 75,000 tons ahead of last year.

Bituminous—Uncertainties have developed in the market which have caused a moderate reaction, and prices are a trifle weaker. There have been no important revisions, however, and it is not thought by any means that the top of the market has yet been reached. Some agencies tied up with low-priced contracts have been forced into the open market to meet their obligations because of the slow movement. Liberal shipments on contracts continue, consumers evidently endeavoring to keep full stocks as long as possible. The car supply situation continues more alarming each week. It is obvious that the heavy movement of all kinds of traffic is creating a pronounced congestion, which shows every indication of becoming more serious as the season advances.

Exports—The only favorable aspect of the off-shore business is the bunkering trade, which continues fairly heavy. The constantly increasing ocean freights have brought the foreign business practically to a standstill. Some attractive inquiries are still being received, though these are perhaps less numerous as it is becoming clear that the more advantageous terms obtainable in Great Britain, both as regards initial cost and transportation, are beginning to tell. The higher ocean freights are spreading to the coastwise trade where some premiums have been noted during the past week.

Lake Market—While the approaching end of the shipping season is always the cause of apprehension, there are other constructive factors in the market that make the situation rather mixed. Cars are growing steadily scarcer, labor is none too plentiful and there is a strong possibility of a sharp rush for surplus coal at any time to provide for a possible suspension in April. Bituminous shipments to the upper Lake ports for the season to the first of the current month are one and three-quarter million tons behind last year, although this is due primarily to the heavy stocks carried over from the previous season. A lull has developed in the domestic trade, but there has been a still further expansion in the manufacturing which has had a tendency to stiffen up prices on steam coal.

Middle West—The recent lower temperature has had a beneficial effect on the market which was beginning to show some soft spots, and accumulations have been substantially reduced. Operators are holding rigidly to their policy of curtailing productions rather than attempt to force the market, and in view of the existing car and labor shortages, together with the comparatively small stocks on hand, the technical position of the market is strong. The mild weather has tended to curtail the movement out from the upper Lake ports. As a rule industrial operations throughout the Middle West are close to full capacity and it is seldom that much difficulty is experienced in finding prompt disposition of any shipments.

A Year Ago—Anthracite shippers are aggressively canvassing for orders but the recent cold snap has steadied up the market. Tidewater bituminous stocks continue at a maximum, and substantial concessions are obtainable.

BUSINESS OPINIONS

The Iron Age—With new orders steadily running far in excess of current output, it was not surprising that the United States Steel Corporation withdrew quotations in foreign markets last week. This action does not in itself mean a long withdrawal from the export trade, for similar steps are taken at intervals in the domestic market. The fact is that the steel companies have the greater part of their output sold for four or five months, some for most of the first half of 1916, and that in certain lines the market on forward deliveries has been sold to a standstill. Conservative men in the trade who thought two months ago to hold demand in check by asking sharp advances have given up effort on that line. The past week has shown unmistakable signs of a steel market that has cut loose. Pig iron, with somewhat less reason, is following the course of steel.

Boston News Bureau—The continued betterment in fundamental conditions begins to impress itself upon people generally. Every day sees some industry that has been a laggard wheel into the procession. This is a stimulus that makes for confidence and incites broader operations. There is a rising market in all products—in steel, in copper, in lead, in zinc and even in oil. Railroads are moving more traffic and both gross and net earnings are increasing appreciably. Notwithstanding all this, money is still redundant. We are beginning to see the value of the federal reserve system. The power to expand is very real.

Dun—In spite of the rapidity of the movement, there is no slackening of the advance that foreshadows the greatest commercial development in the history of the country. Following many months of gradual recovery and adjustment to new conditions, progress has come with such a rush that reaction is feared in some quarters; yet the economic position steadily gains in strength and seldom, if ever, has the situation so favored continued expansion.

Building Statistics—Permits granted last month, according to returns received by "Dun's Review," from the Building Departments of 86 of the leading cities in the United States, call for the expenditure of $59,622,149, an increase of 23.7%, as compared with the $48,058,062 reported for the corresponding period a year ago.

Dry Goods Economist—The recovery in the cotton market, bringing the New York price for spot cotton to 11.75c., was hardly needed to add strength to the price of finished cotton fabrics. In these goods labor and the cost of finishing are important factors. To sellers of gray goods, however, the advance is welcome.

Bradstreet—Mild weather and delay in crop marketing tend to retard retail buying of heavy seasonable goods as distinguished from edibles, but over against this is to be noted increased demands on jobbers, wholesale dealers and manufacturers, which point to a veritable trade ground swell, such as was witnessed in years like 1912, just before the Balkan war began, and in the flush times of 1906. The fact seems to be that in general trade, as in iron and steel and kindred lines, domestic demand had lagged behind and stocks in final distributers' hands were depleted, causing recent eager buying, which has resulted in a mass of orders.

Southern Lumberman—Price advances in the yellow pine market during the past week have been so rapid and so repeatedly made that the problem of ascertaining prevailing prices is rendered unusually difficult. Speculation is now a factor in buying, and despite increased production there is no sign of weakening anywhere along the line. In fact, advances ranging from fifty cents to a dollar have occurred practically throughout the list, and as increases are being announced almost daily by many of the mills, still higher values may be expected during the coming week.

Marshall Field & Co.—Current wholesale distribution of dry goods has been in excess of the corresponding period of a year ago. Road sales for both immediate and future shipment have been in much larger volume, and more customers have been in the market. Collections are normal.

ATLANTIC SEABOARD

BOSTON

Pocahontas and New River easy with prices unchanged. Low on-car prices for 1916 extend to points accessible to lighter. Georges Creek shippers conservative on futures. Pennsylvania grades less active. Water freights continue to advance. Anthracite trade good.

Bituminous—With a liberal movement on contract from Hampton Roads the situation of Pocahontas and New River continues fairly easy. There is ample coal on cars and very little spot inquiry, so there is practically no change in prices f.o.b. Meanwhile, consumers in this territory are trying to keep storage full in anticipation of slow movement later. The high winds along the coast have interfered materially with the movement of tows and several of the shippers are behind on deliveries. If there develops a widespread shortage of cars for all-rail shipments it is likely that an extra demand will be thrown on the Tidewater trade, but this is not looked for under a month's time, if it comes at all. Developments seem to be slow so far as concerns firmer prices on Pocahontas and New River.

The canvass for contracts inland continues, but somewhat less actively, probably on account of the rapid advance in water freights. As low as $3.35, however, has been named on cars Mystic Wharf, Boston, for the year beginning Apr. 1, 1916, and a similar basis has lately been extended to cover deliveries to dealers and consumers' wharves that can be reached by lighter from the various terminal handling plants. A large volume of business has been closed, but for the most part in usual channels.

Georges Creek shippers are filling requisitions with reasonable despatch, but new business is being consistently declined. This is true especially of deliveries all-rail, a car shortage being somewhat in evidence in the Maryland districts.

The better grades from Pennsylvania continue in active demand, due in part to increased quotas required by consumers on contract, but chiefly to difficulties with mine-workers, particularly in the non-union districts. Some shippers are declining new business until the outlook is clearer. The car movement all-rail is easier than a week ago.

Water Freights have advanced another 10c., $1.10 having been paid on a 5,000-ton schooner, Hampton Roads to Portland. As high as $1.50 is rumored to have been paid on a small barge to Bangor, Me., but the premium in this case is due to the approach of river closing. The rate from Norfolk to Long Island sound ports is still 50 cents.

Anthracite continues in good demand, but it cannot be said there is any great pressure for shipments. In spite of the slow movement of transportation the shipping companies are able so far to keep up with their orders. There is some inclination on the part of retailers to file orders well in advance of needs which helps to discount any "pinch" within the next month or two.

Bituminous quotations, f.o.b. loading ports at points designated, are about as follows per gross ton:

	Philadelphia	New York	Baltimore	F.o.b. Mine
Clearfields	$2.25@2.75	$2.55@3.00	.....	$0.95@1.50
Cambrias and Somersets	2.45@2.95	2.70@3.20	.....	1.20@1.65
Georges Creek	2.92@3.02	3.22@3.32	$2.85@2.95	1.67@1.77

Pocahontas and New River prices, on cars Boston, are $3.45@3.73. Providence, $3.45@3.63; and f.o.b. loading ports at Hampton Roads, $2.80@2.85.

NEW YORK

Anthracite situation satisfactory. Demand steady and all prepared coals tighter. Line trade heavy. Fair movement in soft coals. Good grades scarce and none to be had in open market. Mine prices stiffer.

Anthracite—The hard coal situation continues satisfactory. There is a steady demand which keeps everybody busy and there has been a slight delay in loading some grades unless a mixed cargo is taken. Wholesale houses are paying more attention to the approaching end of the labor agreement than a few weeks ago and there is more hesitancy in the closing of contracts for the delivery of steam coals after the new year. The lack of cars is becoming more serious with the approach of winter.

Egg coal is not as plentiful, but occasional lots are picked up at 10 cents below the circular. Stove is the shortest of the domestic grades and is going at full price, while chestnut is in the same class as egg. The line trade complains of its inability to secure all the chestnut coal desired but much of this delay is due to the scarcity of the kind of cars desired.

Steam coals are coming into their own. Pea is in fair demand and is commanding nearly full price in all instances. High grades of buckwheat No. 1 have been quoted at $2.70 f.o.b. lower port, but this was the exception. The cheaper grades are quoted at around $2.40. Buckwheat No. 2 is short in all grades and there are reports of 10c. premiums for quick deliveries.

Quotations per gross ton, f.o.b. Tidewater, are as follows:

	Lower Ports		Upper Ports	
	Circular	Individual	Circular	Individual
Broken	$5.05		$5.10	
Egg	5.30	$5.20@5.30	5.35	$5.25@5.35
Stove	5.30	5.25@5.30	5.35	5.30@5.35
Chestnut	5.55	5.40@5.55	5.60	5.50@5.60
Pea	3.50	3.25@3.50	3.55	3.50@3.55
Buckwheat	2.75	2.25@2.75	2.80	2.25@2.80
Rice	2.25	1.85@2.25	2.30	2.00@2.30
Barley	1.75	1.50@1.75	1.80	1.75@1.80

Bituminous—There is a good movement, but there has been a slight easing up. The supply at Tidewater is not large, considerable coal being rushed to the Lakes and Western points. While much coal is on its way here, good grades are scarce and fair coals are easily disposed of at good prices.

Car supply shows no improvement, while the freight congestion on nearly all roads centering here is tying up much of the available rolling stock. Some mines are reported as receiving from 50 to 60% of their usual quota of cars. Many large steam users are inquiring for more coal than their contracts call for and are picking up the choicest of the cheaper grades. Mine prices are stronger, some of the poorer coals being quoted at $1.25.

Increasing freight rates are interfering with the export situation. The trade heard last week of a foreign gas corporation in the market for 20,000 tons of coal, but refused to pay the freight rate demanded. Inquiries are also being received from Brazil. Bunkering remains heavy.

Current quotations on various grades per gross ton, f.o.b. Tidewater, are about as follows:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein	$3.20@3.30	$3.20@3.30	$3.20@3.30	$1.75@1.85
Georges Creek Tyson	2.95@3.00	2.95@3.00	2.95@3.00	1.40@1.45
Clearfield:				
Medium	2.80@2.85	2.80@2.85	.....	1.25@1.35
Ordinary	2.75@2.80	2.75@2.80	.....	1.20@1.25
Broad Top Mountain				1.25@1.45
Cambria County:				
South Forks	3.05@3.10	.....	.....	1.50@1.60
Nanty Glo	2.90@3.00	.....	.....	1.35@1.45
Barnesboro	2.85@2.90	.....	.....	1.30@1.35
Somerset County:				
Quemahoning	.....	2.90@3.00	2.90@3.00	1.35@1.45
Medium	2.80@2.90	2.80@2.90	2.80@2.90	1.25@1.35
Latrobe	2.70@2.75	.....	.....	1.15@1.20
Greensburg	2.90@3.00	.....	.....	1.25@1.35
Westmoreland	3.20@3.30	.....	.....	1.45@1.55
West Virginia Fairmont		2.70@2.80	2.70@2.80	.90@1.10
Fairmont mine-run		2.70@2.75	2.70@2.75	.90@1.00
Steam		2.70@2.80	2.70@2.80	1.15@1.25
Western Maryland		2.70@2.80	2.70@2.80	1.15@1.25

PHILADELPHIA

Anthracite checked by mild weather but prices strong. Prepared sizes in generally good demand. Buckwheat also active but ordinary grades of rice are going heavily to storage. Collections good. Bituminous orders, hard to fill because of car shortage.

Anthracite—Too much mild weather has had an adverse effect on the market and delayed the expected rush. Shippers and the dealers are chafing at the postponement, since the time lost represents coal that will never be burned. However, the market has moved along quietly and all sizes are in very fair demand, but not sufficiently to cause a scarcity. There have been a few instances of coal standing at scales without orders, that was sacrificed, but on the whole good grades are bringing the full circular.

Pea coal is being stocked, but not in the quantities expected. It is a good buy at $2 and the tax, the price at which the companies have protected the best trade until Jan. 1. Next month the demand for this grade will probably be unusual.

Broken is all sold and the demand is increasing. Egg is none too strong and just now is probably the weakest size. Stove is one of the best sellers, if not the very best. Chestnut is doing very well and much better than for some time. Buckwheat is growing stronger, with special grades in very active demand. Only certain grades of rice are selling, this size still being largely sent to storage by the companies.

Another noticeable feature of the market recently is the amount of new business coming to the larger companies from firms who have not bought for several years. This indicates that these dealers are looking to the future in case of trouble in the regions. Collections are good and there is hardly likely

to be any trouble in this direction for a long time to come, as the dealers all realize their cases would be hopeless with coal scarce and their accounts in bad shape.

Prices per gross ton at the mines and for tide shipments f.o.b. Port Richmond are as follows:

	Line	Tide		Line	Tide
Broken	$3.50	$4.75	Pea	$2.50	$3.25
Egg	3.75	5.00	Buckwheat	1.50	2.25
Stove	4.00	5.00	Rice	.85	1.75
Chestnut	4.15	5.25	Barley	.50	1.50

Bituminous—At this writing it is very much a broker's market; that is, on account of many shippers being tied up on low-price contracts and their inability to get full shipments from their operations, they are compelled to buy in the open market to meet their obligations. In several instances purchases of coal were made on this account at 40c. above the contract price. Under such conditions mine owners are not willing to consider any new contract business at current prices. While there has been no particular price change in the past two weeks, it is felt that the top of the market has not been reached.

Export shipments seems to be dwindling and even the foreign inquiries, which up to this time have been very plentiful, are falling off. Large shipments are now being made from the British Isles at prices, both as to coal and freight, which now place the American market at a decided disadvantage.

The ruling prices per gross ton at the mines are well represented by the following list:

Georges Creek Big Vein	$1.70@1.80	Fairmont gas, ¾	$1.35@1.45
South Fork Miller Vein	1.55@1.65	Fairmont gas, mine-run	1.20@1.25
Clearfield (ordinary)	1.20@1.30	Fairmont gas, slack	.90@1.00
Somerset (ordinary)	1.20@1.25	Fairmont lump, ordinary	1.15@1.20
West Va. Freeport	1.05@1.15	Fairmont mine-run	1.00@1.10
		Fairmont slack	.90@1.00

BALTIMORE

Uncertainties in the trade cause a moderate reaction. Car supply becomes shorter. Exports declining heavily as a result of high freights.

The coal trade here is being squeezed every few days by lack of cars in important mining districts, and then again by scarcity of boats at Tide when fuel is rushed through on export account. These uncertainties have made the market a trifle weaker as to prices, although the best coals for the most part are out of the market. Despite the fact that coal men have offered as high as $18 on movement to the west coast of Italy, where there is a heavy demand, the export movement from this port has suffered a heavy slump. During the week ending Nov. 13 only 12,668 tons was loaded here for foreign ports.

The car supply in most of the mining districts of Maryland, West Virginia and Pennsylvania the past week has not averaged much more than 60%. Demand for coal has eased off a bit, however. Prices in gross tons to the trade are about as follows:

	Mines	Balt.*		Mines	Balt.*
Geo. Crk. Big Vein	$1.80	$2.98	Fairmont		
Geo. Crk. Tyson	1.50	2.68	Ordinary mine run	$0.95	$2.33
Clearfield	1.30	2.48	Ordinary ¾	1.00@1.05	2.43@2.48
South Fork	1.45	2.63	Ordinary slack	.95	2.38
Latrobe	1.10	2.18	Low sulphur mine-run	1.20	2.63
Somerset (best)	1.40	2.58	Low sulphur ¾	1.30	2.73
Somerset (good)	1.25	2.43	Low sulphur slack	1.00	2.43
Quemahoning	1.35	2.53			
Freeport	1.10	2.18			
Miller Vein	1.30	2.38			

* F. o. b., outside Capes.

Anthracite dealers here are busy. Colder weather has awakened the domestic consumers, and they are clamoring for coal. Supplies are pretty free, although all dealers are not able to fill gaps as made in their yards.

HAMPTON ROADS

Foreign and coastwise dumpings show some improvement. Government takes some coal by colliers and bunkers several vessels from barges.

The dumpings for the second week of November have shown some improvement over those for the first week, although this improvement has not been large. One of the most interesting shipments of the week was that to Barcelona, by the schooner "Edward J. Lawrence;" this cargo consisted of 4,967 tons and the freight rate was $10.50 per ton. In addition to coal loaded into colliers the government has also taken some by barge for bunkering several of the ships now in Hampton Roads.

The accumulation of coal on the railroad yards is still somewhat above normal, but there is a fair amount of vessel tonnage in port and with that about due this accumulation should be considerably reduced early in the coming week.

There has been practically no change in prices on the various grades of coal shipped from this port. Some few sales have been made during the week, but so far as can be ascertained the greater part of the coal moving has been applied on contract business.

Railroad Tonnages—Dumpings over the local piers for the past five weeks compare as follows:

	Week Ending				
Railroad	Oct. 16	Oct. 23	Oct. 30	Nov. 6	Nov. 13
Norfolk & Western	145,236	163,920	126,145	120,590	133,329
Chesapeake & Ohio	66,361	81,517	74,028	78,210	70,282
Virginian	54,964	51,304	78,237	46,952	72,888
Totals	266,561	296,741	278,410	245,752	276,499

Ocean Charters, Clearances and Freights

OCEAN CHARTERS

The following charters have been reported from various sources during the past week:

PHILADELPHIA

Vessel	To	Tons	Rate
Coniston	Rosario	2,363	
P. Setzer	Mayport	1,268	1.15
E. Drake	Martinique	789	3.90
J. W. Elwell	Rosario	1,081	
Daylight	Fort-de-France	571	3.75
A. J. Trainer	Calais	336	1.35
Claveresk	Antilla	2,441	

BALTIMORE

Vessel	To	Tons	Rate
Vindeggan	Sweden	1,519	
Mimer	Mexico	699	

BALTIMORE—Continued

Vessel	To	Tons	Rate
Jean	Mayport	2,391	
Hilton	Tampa	2,324	

VIRGINIA

Vessel	To	Tons	Rate
Inverkip	Rio Janeiro	2,806[1]	9.36
Jacksonville	Bermuda	547	8.00
E. H. Blake	Bermuda	484	3.25
Calumet	Pernambuco	1,094	8.00
Sif	St. Lucia	1,959	
Siam	Buenos Aires	800	8.00

[1] 500 tons per day.

VESSEL CLEARANCES

The following steamers have cleared from various ports during the week ended Nov. 14:

NORFOLK

Vessel	Destination	Tons
Lewis[1]	Grand Bank	75
Giovanni[2]	Porto Ferrajo	4,600
Strathalbyn[2]	Dakar	6,508
Curaca[3]	Valparaiso	1,500
Kalliope[4]	Rio de Janeiro	2,588
J. Lawrence[4]	Barcelona	4,967
Parodi[5]	Maddalena	5,529
Silvia[2]	Genoa	5,590
Ulysses[6]	Canal Zone	12,015
Berwindmoor[7]	Havana	8,000
Wegadesk[8]	Canal Zone	6,500
Navrogordatos[2]	Savona	4,450
Romford[3]	Port Castries	4,500
Fructidor[5]	Italy	5,000
Trafalgar[4]	Havana	3,000
Vitalia[9]	St. Thomas	1,450
Dominic[10]	Para & Manaos	2,700

NEWPORT NEWS

Vessel	Destination	Tons
L. Neff[11]	San. de Cuba	1,100
Mashona[12]	Buenos Aires	4,000
Primo[5]	Italy	5,700
Sif[11]	St. Lucia	4,700
Coquet	Marseilles	5,500

BALTIMORE

Vessel	Destination	Tons
Santa Anna	Italy	1,972
Enrichetta	Italy	5,017
Vindeggen	Sweden	3,466
W. Bennett	Martinique	712
M. Baxter	Cuba	1,501

PHILADELPHIA

Vessel	Destination	Tons
A. J. Turner	Calais	336
G. E. Klinck	Camden	800
Harrisburg	Boston	
Powell[14]	Boston	
Skippack[13]	Brookline	
Monitor[13]	Portland	
Tabor[13]	Portland	
Belita	Vita, Cuba	
Cacoosing[13]	Scituate	
Macungie[13]	Providence	
Paxinos[13]	Quincy Point	
Conewago[13]	Bangor	
Preston[13]	Gloucester	
Rutherford[13]	Portland	
Lincoln[13]	E. Cambridge	
Ontelaun[13]	Milton	
Maple Hill[13]	Boston	
Frankrie	Havana	
Ashland[13]	Boston	
Cumberland[13]	Portsmouth	
Herndon[13]	Portsmouth	
Shawmut	Mayport	
Anna	Quebec	1,800
F. & A. Allen	Calais	735
J. H. Elwell	Rosario	1,900
Suffolk[13]	E. Boston	
Brookside[13]	Brookline	
Pocopsin[13]	Milton	
Penn	Portland	
E. Garden	Salem	
W. D. Marvel	Calais	650
S. M. Seaman	Arroyo	
H. A. Alyn	Boston	
Novo	Buenos Aires	2,200
R. P. Murphy	Martinique	527

[1] Norfolk C. & I. Co. [2] Pocahontas Fuel Co. [3] Castner, Curran, & Bullitt, Inc. [4] Smokeless Fuel Co. [5] New River Coal Co. [6] W. C. Atwater & Co. [7] Baker Whiteley. [8] Crozer-Pocahontas. [9] Hasler Bros. [10] Chesapeake & Ohio Coal & Coke Co. [11] Berwind White. [12] Wyatt Coal Co. [13] Phila. & Reading Coal & Iron Co. [14] Sterling Coal Co.

OCEAN FREIGHTS

The freight market continues to advance. The last charters for coals, to Lower Plate ports, were at $10.80, 500 tons per day discharge and steamers are difficult to obtain even on these terms. Shippers of Mediterranean coal are not willing to pay rates owners ask, consequently no chartering is being effected for the movement of coal in this direction. The tonnage scarcity is making it difficult to operate on West Indian orders. We would quote freight rates on coal by steamer as follows:

To	Rate	To	Rate
Havana	$2.75@3.00	Bermuda	$3 50
Cardenas or Sagua	3.00@3.25	Vera Cruz	5.00@ 6 00
Cienfuegos	3.00@3.50	Tampico	5.00@ 6 00
Port au Spain, Trinidad	4.00@4.25	Rio	10.80
St. Lucia	3.75@4.25	Santos*	11.04@11.52
St. Thomas	3.50@3.75	Montevideo	10.80
Barbados	4.00@4.25	Buenos Aires or La Plata†	10.80
Kingston	3 25@3.75	Rosario	12.00
Curacao	3.75	West Coast of Italy	16.80@18.00
Santiago	3.50	Barcelona**	15.60@18.00
Guantanamo	3 50	Valparaiso or Callao	11.00@12.00
Demerara	6.00@6.50	Marseilles	15.60@18.00

* Consignees paying dockage dues. ** Spanish dues for account. † Quotations on Plate coal by British steamers; neutral steamers are more difficult to obtain and the rates are always higher.

W. W. Battie & Co.'s Coal Trade Freight Report.

LAKE MARKETS

PITTSBURGH

Market presents mixed showing, but prompt slack is higher. Operations at 75%. More car shortages.

The trade as a whole has shown little if any improvement, though there is a decidedly stronger market in slack and somewhat more domestic coal is moving. There are divergences of opinion about the future. The end of the Lake season, now near at hand, is always feared, but on the other hand there are unusual prospects for consumers desiring to stock coal against a possible suspension of mining Apr. 1, and this, with the steadily growing scarcity of cars, helps to give the market at the moment a better appearance than it otherwise would have.

The scarcity of slack in proportion to the demand is now pronounced, and the market is quotable at 10c. higher than a week ago, being now almost up to the contract level.

Labor is in only fair supply, while car shortages are daily growing more important. Not much production is being lost, in the aggregate, but the market is held steadier than would otherwise be the case. Operations in the district are at about 75% of capacity.

We quote free coal as follows, slack being higher than last week: Slack, 85@90c.; mine-run, $1.15@1.20; ¾-in., $1.25@1.35; 1¼-in., $1.35@1.45, per net ton at mine, Pittsburgh district. On contract we quote: Slack, 90c@$1; nut, $1@1.10; mine-run, $1.15@1.25; ¾-in., $1.20@1.30; 1¼-in., $1.30@1.40.

BUFFALO

Perplexing difference between this market and most others. Bituminous mines are unable to obtain specified prices. Anthracite slowing down on account of fine weather.

Bituminous—There is a good local demand, but that is about the best feature. This market is decidedly slower than most others. Pittsburgh is setting prices 15c. higher than can be obtained here, especially in Canada and eastward. There is the same difference between us and the Seaboard district from New York southward. Buffalo operators who are able to get into the Seaboard market have more orders than they can fill.

The Allegheny Valley mines cannot reach the Seaboard and they find trade very dull. Some jobbers complain that prices quoted here are too high.

Prices made by the Pittsburgh shippers, which are not always obtainable here, are as follows:

	Pittsburgh	Allegheny Valley	Penn Smokeless
Lump	$2.80	$2.50	$2.55
Three-quarter	2.65	2.30	.....
Mine run	2.55	2.20	2.30
Slack	2.15	1.90	2.30

Anthracite—The weather is too warm for the best results in the local trade and the demand is not as good as it was a week ago. Consumers often get the idea that mild weather is going to prevail for some time and buying is put off. The line rail trade continues good and the Lake shippers are sending out cargoes whenever there is room for them on the Upper Lake docks, regardless of actual sales. As a rule the smaller Lake ports have laid in their supply for the winter. Lake Michigan rates are up. Vessels are refusing 50c. to leading ports and will seldom take 75c. to side ports.

The anthracite mines are running at a much higher rate than through the early fall. The growing scarcity of men has made the operators anxious to get as large a start as possible. The general anthracite circular remains at $5.60 for grate, $5.85 for egg and stove, $6.10 for chestnut, $4.30 for pea, $3.25 for buckwheat, $2.75 for rice and $2.50 for barley, all quotations per long ton, f.o.b. Buffalo, with 25c. additional for delivering on board vessels. Lake shipments for the week were 100,800 tons.

COLUMBUS

Increase in demand for steam sizes. Domestic business quiet, owing to the continued warm weather. Price list well maintained. Car shortage increasing.

With car shortage increasing and a continued expansion in manufacturing, the steam trade is becoming firmer in every locality; this is the best feature of the trade by far, as the warm weather has caused a lull in the domestic business. The tone of the market remains good and prospects for the future are brighter. Coal men are of the opinion that there will be a good demand for the fall and winter season.

Prices are well maintained. Retail trade is good, although deliveries are not as rushed as formerly. Householders are still placing orders for the winter's supply. Pocahontas and plints are in good demand and frequent calls are received for Hocking.

The Lake trade continues active. Boats are now chartered with difficulty because of the demand for bottoms in other lines of trade. Congestion on the docks of the Northwest is gradually passing away.

Railroads are still stocking some tonnage, but the heaviest of the stocking movement is past. Iron and steel factories are buying in larger quantities. The market for small sizes continues strong, as there is a dearth of supply, due to curtailed production of the domestic grades. The anthracite market is growing stronger as the winter approaches. Retail prices are well maintained. There is also an increasing demand for coke in the central Ohio territory.

Prices in Ohio fields are as follows per short ton, f.o.b. mines:

	Hocking	Pomeroy	Eastern Ohio	Kanawha
Re-screened lump	$1.60	$1.65	.....	.....
Inch and a quarter	1.50	1.50	$1.35	$1.50
Three-quarter-inch	1.35	1.40	.....	1.35
Nut	1.25	1.30	.....	1.25
Mine-run	1.15	1.20	1.05	1.10
Nut, pea and slack	.65	.70	.60	.60
Coarse slack	.55	.60	.50	.50

Mines have been working at about the following percentages of full capacity:

District	Week Ended Oct. 23	Week Ended Oct. 30	Week Ended Nov. 6	Week Ended Nov. 13	District	Week Ended Oct. 23	Week Ended Oct. 30	Week Ended Nov. 6	Week Ended Nov. 13
Hocking	60	65	60	65	Cambridge	60	65	70	50
Jackson	60	50	45	70	Massillon	45	70	70	40
Pomeroy	65	90	85	70	Eastern O.	85	80	80	85
Crooksville	85	65	65	75					
					Average	65	69	67	67

CLEVELAND

Steam prices firmer and supplies short. A rushing retail trade marked the opening of the week.

Retail dealers had a rush of orders Monday morning that kept every wagon busy. The dealers are also experiencing some difficulty in getting coal from the operators. The rush is confined almost entirely to Ohio coals.

The receipts of steam coal were light over Sunday, something less than 300 cars having come in. The prices were decidedly firmer and by the end of the week there will be a decided shortage due to the inadequate car supply. As this market is as fickle as the weather a few extra cars would result in a weak market. Fine coal sold up five cents over the preceding week. Good slack brought $1.75 on track here to jobbers and $1.80 to the consumers.

The Lake trade is satisfactory. The shipments to the Lake will practically end this week and except to the smaller Lake Michigan ports, few cargoes at a premium are expected. There will be no rush to put extra stocks afloat this year because upper Lake docks are overstocked as it is.

Jobbers are paying the following prices f.o.b. Cleveland per short ton:

	Pocahontas	Youghiogheny	Fairmont	Bergholz	Ohio No. 8
Freight rate	$1.45	$1.00	$1.15	$0.70	$0.90
Lump	3.60				
Lump, 6-in.				2.30	
Lump, 1¼-in.		2.40		2.10	2.15
Lump, ¾-in.		2 30	2.15	2.00	1.95
Egg	3.60				
Egg, 6-in.				1.90	
Mine run	2.75	2.15	2.05	1.90	1.85
Slack		1.90	2.00@2.05	1.75	1.75

TOLEDO

Lake movement of coal and ore heavy. Car shortage interferes materially with shipping. Steam demand strong.

The domestic market is showing some weakness, due largely to the pleasant weather conditions. The steam trade is much stronger; the demand is better and prices are stiffer. The car congestion is becoming more noticeable and the grain men have taken the matter before the state commerce commission. There is some heavy shipping both in coal and ore as the season advances. No announcement concerning the close of navigation has been made as yet.

DETROIT

Sales of steam coal diminish. Domestic trade continues in small volume. Anthracite buying lacks activity. Lake shipments near end.

Bituminous—Consumers of steam coal appear to have lost some of the interest which marked their buying a few days ago. The easing off tendency developed after two or three days of increased activity which had aroused expectations of a further improvement. Domestic coal continues sluggish due to mild weather. But despite the less encouraging situation, prices hold closely around mine quotations, even on most of the consignment stock. On some sales of the latter a reduc-

tion of 15 to 25c. a ton has been reported on large sizes to avoid demurrage accruing. The quantity of consignment coal on hand is not large. Car shortage reports continue to come from Ohio and Pennsylvania districts.

Anthracite—Little business is now being done in anthracite. Buyers seem to be holding off and orders to shippers are irregular and for small amounts.

Lake Trade—Vessels are difficult to obtain, because of continued activity in other lines. Higher freight rates to Lake Michigan ports in 1916 are expected as a result of ore shippers having made extensive contracts at an advance of 10c. a ton over the rates of this season. By taking a large proportion of the freighters to the Lake Superior route next year, the increased ore rates are likely to cause coal shippers on Lake Michigan to bid higher than the 30c. rate now in effect to the chief unloading ports.

CINCINNATI

Colder weather has so far not affected the market. Car situation has maintained prices.

The coldest weather of the fall was experienced in this vicinity last week, but the domestic demand has not responded, dealers evidently having sufficient coal on hand. The activity in the coking industry has absorbed all available slack, production being at a low level on account of the shortage of cars which has grown worse, rather than better, and when demand reaches normal it is difficult to see how the situation can be handled. In view of these conditions prices are strong and firm, with every indication of further improvement.

LOUISVILLE

Steam sizes improving but considerable domestic grades are on demurrage due to mild weather.

Steam sizes have been moving rapidly and where a week or ten days ago there was no sale for them, they now are in brisk demand. Many of the operators have quantities of domestic coals at shipping centers where it is waiting on demurrage; one day of sharp weather created a flurry in this class of coal but warmer temperatures again eased up the demand.

Sales during the week, long-ton basis, f.o.b. mines, have ranged around $1.75 to $2.10 for eastern Kentucky block, while western Kentucky lump has brought something over $1.25 with slack at 25c. and better.

BIRMINGHAM

Market substantially better, particularly on domestic grades.

Business on both steam and domestic lump coal continues to improve, especially lump, as dealers are beginning to lay in larger stocks. The car supply outlook is a potent factor, as it is feared that there will be a serious shortage by the first of the year. While the improvement on steam coal is not so marked, still conditions are better than they were thirty days ago, and showing a steady improvement as winter approaches. New mines are being opened, and others are running practically full time.

COKE

CONNELLSVILLE

Prompt furnace coke much easier and foundry softens a trifle also. Some contracts for next year. Production and shipments slightly decreased.

So far as the relation between demand and supply is concerned the bottom has fallen out of the prompt furnace coke market. There is very little demand and there are supplies in excess of the demand, but holders are not thus far under any necessity of selling, it being only very recently that they could have disposed of prompt coke to very good advantage. There would be no difficulty in buying spot furnace coke at $2.25, against $2.40 to $2.50 quoted a week ago. The softness in spot furnace coke has been reflected in only small degree in the spot foundry coke market, which is only a shade easier.

The Youngstown Sheet and Tube Co. has renewed its contracts for furnace coke with the two interests now serving its four stacks, but the new contracts run only for the first three months of 1916, or up to the time when the company's new byproduct coke plant at Youngstown is expected to be in operation. The contracts involve about 70,000 tons a month and the price is reported to be close to $2.50, as the delivery is for the period of 1916 for which the highest prices are expected. A contract could be made over the whole year at much less. Corrigan, McKinney & Co. are understood to have contracted for about half their requirements for 1916, with the interest that now has the entire tonnage. We quote: Prompt furnace, $2.25; contract furnace, first half, $2.35@2.50; year, $2.25@2.35; prompt foundry, $2.90@3.15; contract foundry, $2.90@3.15, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Nov. 6 at 424,162 tons, a decrease of 8,357 tons, and shipments at 426,093 tons, a decrease of 15,818 tons.

Buffalo—The demand is good and if the seller has genuine Connellsville foundry product on hand he can obtain the full circular price for it, which runs as high as $5 for best 72-hr. foundry, with gradations for lower quality down to $4.35 for stock coke. At the same time there is coke on the market that sells for considerably less than these figures. There are predictions that the prices will advance still further, as the supply of men is very short and does not promise to improve right away.

Chicago—The foundry-coke market retains its strength, and has been steady all week at $5.50; an increased tonnage of Connellsville has been sold at the same price. Byproduct sizes have softened slightly owing to unseasonable weather. The demand for gashouse coke has been steady. Prices per net ton f.o.b. cars Chicago are as follows: Byproduct foundry, $5@5.50; byproduct domestic, $4.75@5; Connellsville, $5.50; Wise County, $5@5.25; gas coke, $4@4.25.

Birmingham—With the large number of furnaces already in blast, and others being repaired and going into blast, the coke market is strong with the demand equal to the output. Several large contracts for shipments over the next twelve months have recently been made to one of the large iron producers, and another company will put into blast immediately a battery of ovens which has not been operated for several years. Shipments of foundry coke are improving. Prices on both grades are satisfactory.

MIDDLE WESTERN

GENERAL REVIEW

Colder weather gives impetus to domestic trade. Fine coals stronger and upward trend on steam grades. Smokeless market softer.

Temperatures became much lower during the close of last week and this had a beneficial effect, accumulated stocks of domestic sizes beginning to melt away immediately. Colder weather has brought about a renewal of buying, and with both labor and car shortages, together with comparatively small stocks in the hands of dealers, it is felt that the reaction of the past few weeks will not be repeated during the balance of the season. Prices are generally well maintained, although in spots concessions have been made to move coarse sizes accumulated at the mines. Lack of car supply has been a potent factor in restricting shipments of consignment coal during the recent warm weather, the railroads in some cases not furnishing empties where unbilled coal on hand amounted more than 50% of the daily output.

Railroad requirements have been generally increased due to heavier traffic. The volume of steam coals moving is now in excess of last year's tonnage to date. The general attitude of the Western producers has been to curtail operating time rather than to force the markets. Screenings have gained strength from the curtailment of domestic production, and contract demands leave no surplus fine coal. Industrial centers are in full blast, and unloading of coal shipments is prompt with little disposition shown to delay equipment.

CHICAGO

Operations curtailed to meet a slowing up in the demand. Considerable slack going into storage. Arrivals of Eastern coal light.

Franklin County operators have been restricting production; it is said they now have 150,000 tons of slack stored on the ground. Southern Illinois screenings are being sold at 50c. in Chicago and 60c. at interior points. A number of Williamson County mines have closed down, preferring to be idle rather than to force the higher grade coals on the market.

All grades in the Springfield district are in slight demand, and some mines have been compelled to suspend operations for a few days. A little domestic coal has been moving as low as $1.50, but strict adherence to the $1.75 price is observed by most operators. Screenings are steady.

Indiana operators are more optimistic on the outlook, as manufacturing plants of the state have obtained a large volume of war orders. No. 4 domestic demand has softened, and orders for Nos. 5 and 6 grades are heavier.

This market has called for relatively little smokeless coal during the past ten days. Apparently the car supply at the smokeless mines has improved and more spot shipments are reaching Chicago, which has softened prices. Lump is

weaker, but egg is in better demand, and nut is active. Pennsylvania smokeless is still strong owing to lack of cars. All-rail splint is reaching too high prices to be an attractive buy.

Hocking domestic trade has been quiet, but with colder weather prices are likely to be higher. Stocks are only fair, and buying will soon be necessary.

An easing in the demand for anthracite has occurred and prices have weakened due to the unsold coal on track, although the circular is being strictly observed in the outlying Western territory. Many complaints are made that all-rail orders are slow in being filled and the movement is slow. Stocking by Western dealers is still behind other years.

Quotations in the Chicago market are as follows:

	Williamson and Franklin Co.	Springfield	Sullivan	Clinton	Knox and Greene Cos.
Lump	$1.65@1.75	$1.60@1.75	$1.50@1.60	$1.50@1.60	$1.50@1.60
Steam lump	....	1.25@1.35	1.25@1.35	1.15@1.25	....
2½ and 3-in. lump	....	....	1.35@1.50	....	1.35@1.40
1¼-in. lump	....	....	1.25@1.35	....	1.25
Egg	1.50@1.75	1.50@1.60	1.15@1.30	1.20@1.30	1.40@1.50
Nut	....	1.65@1.70	1.10@1.15	1.25@1.35	1.20@1.30
No. 1 washed	1.60@1.75	....	1.50@1.60	....	....
No. 2 washed	1.40@1.50	....	1.45	....	....
No. 1 nut	1.60@1.75	....	....	....	....
No. 2 nut	1.50@1.60	....	....	....	....
Mine-run	1.10@1.15	1.05@1.10	.90@1.00	.90@1.10	1.00@1.05
Screenings	.50@ .60	.40@ .50	.50@ .60	.55@ .65	.65@ .75

	Harrisburg & Saline Co.	E. Kentucky	Pocah. & W.Va.Smok'l.	Penna. Smokeless	Hocking
Lump	$1.60@1.75	$1.60@2.25	$1.90@2.25	$2.00@2.25	$1.50@1.75
1¼-in. lump	1.30@1.40	....	....	....	1.50
Egg	1.60@1.75	1.45@1.85	2.00@2.25	2.00@2.25	1.10@1.25
Nut	....	1.25@1.55	1.60@1.75	1.40@1.60	....
No. 1 nut	1.65@1.75	....	....	....	....
No. 2 nut	1.40@1.50	....	....	....	....
Mine-run	1.10@1.15	1.15@1.25	1.25@1.40	1.25@1.40	1.15@1.25
Screenings	.50@ .60	.60@ .75	....	....	.55@ .75

INDIANAPOLIS

Mild weather continues, curtailing the demand for domestic grades of coal and restricting production. Screenings stiffening. Some mines closed for lack of cars.

Fair weather is still against the movement of domestic grades and this has cut down the production of screenings, with the result that there has been a stiffening of prices on the latter. There are few if any sales under 60c. f.o.b. mines. Operators are experiencing the first real car trouble and some mines are shut down. The railroads report a shortage, even in box cars.

The industrial demand for coal has made no special improvement recently, but continues much better than in the spring or summer. Sentiment is growing more optimistic. Railroad buying has increased considerably the last month. Mines have been going into operation week by week in all parts of the Indiana field.

ST. LOUIS

Domestic demand stimulated slightly by cooler weather. Prices fairly steady.

Slightly colder weather has quickened the demand somewhat for domestic grades, but a much greater drop in temperature is needed before there will be any substantial improvement. Reduced operation has forced the price of Staunton and Standard screenings still higher. Prices of the lump grades have been kept fairly steady by a considerable effort. There has been sporadic selling at prices below the quotations, but in the main the prices have held. The prices of nut, pea and slack continue better than at this time last year.

Quotations f.o.b. mines during the past week have ranged on the following basis per short ton:

	Frnk. Co.	Wlmson. Co.	Staunton	Standard
6-in. lump	$1.50@1.75	$1.50@1.75	$1.25@1.35	$1.25
8-in. lump	.....	.....	.....	1.25
2-in. lump	.....	.....	1.15@1.20	1.00@1.10
3x6 egg	1.40@1.75	1.40@1.65	.....	1.00
2x6 egg	.....	.....	.....	.80@.85
No. 1 nut	1.50@1.75	1.50@1.75	.....	.80
No. 2 nut	1.40@1.50	1.40@1.50	.....	.60
No. 1 washed	.....	1.65	1.50	.....
No. 2 washed	.....	1.25	1.10@1.25	.....
No. 3 washed	.....	1.25	1.10@1.25	.....
No. 4 washed	.....	1.20	1.05	.....
No. 5 washed	.....	.60@.70	.50@.60	.....
Screenings	.60@.65	.60@.65	.30@.35	.30@.35

Freight rates—Inner group, St. Louis 57½c.; East St. Louis 37½c. Outer group, St. Louis 72½c., East St. Louis 52½c.

DULUTH

Coal receipts continue light. No great activity in shipping. Anthracite firm.

Figures given out during the week show a decrease in receipts of bituminous coal for the month of October over the corresponding month of last year, of 209,144 tons and a decrease in the total receipts for the season to Nov. 1 of 1,735,687 tons. This large falling off is due to the fact that all the shipping companies carried over heavy stocks from the previous year, the amount in storage at the present time being well up to that of former years, so that no shortage is anticipated. Nearly all the dock companies report shipments of bituminous a little below the average. The lack of inquiry is attributed to the large amount of work that had to be done on the farms this fall, and to the mild and pleasant weather, that has prevailed for the past six weeks. No change in quotations has been announced, but prices remain firm. Quotations for immediate delivery, f.o.b. cars, per short ton, are as follows:

	Yough	Splint	Hock	Smokeless	Elkhorn
Lump	$3.40	$3.40	$3.40	$4.75	$3.75
Dock run	3.10	3.10	3.05	3.25	3.25
Stove or nut	3.40	3.40	3.40	4.75	3.65
Screenings	2.40	2.40	2.25	2.75	2.40

Figures compiled during the past week show an increase in the receipts of anthracite for the month of October over the same month last year of 26,493 tons and a total increase for the season to Nov. 1 of 74,920 tons. The demand has been fairly well maintained in spite of the very mild weather and with a little touch of winter, a brisk inquiry is bound to arise. Quotations are as follows: Egg and stove, $6.85; nut, $7.10; pea, $5.55 and buckwheat, $4, all f.o.b. cars, per short ton, at Duluth.

PRODUCTION AND TRANSPORTATION STATISTICS

EXPORTS

Exports of domestic coal and coke from the United States, and bunker coal laden on vessels engaged in the foreign trade at the specified districts, during the month of September, 1915, were as follows:

	Anthracite	Bituminous	Coke
Maine and New Hampshire	971	22	.....
Maryland	.....	200,926	208
Massachusetts	252	2	.....
New York	20,273	2,008	2,922
Philadelphia	11,552	64,351	97
Porto Rico	.....	60	.....
Virginia	.....	603,558	.....
Mobile	20	502	.....
New Orleans	59	909	3
Arizona	.....	2,608	7,090
El Paso	.....	10,974	2,113
Laredo	.....	2,775	.....
San Francisco	.....	36	20
Washington	.....	521	3,345
Buffalo	119,440	174,251	34,316
Dakota	700	2,311	139
Duluth & Superior	6,160	1,627	182
Michigan	24	40,367	6,407
Ohio	36	646,287	379
Rochester	50,713	60,062	543
St. Lawrence	78,800	18,660	1,616
Vermont	790	460	15
Total	289,790	1,832,977	59,395

BUNKER COAL

Districts	Gross Tons	Districts	Gross Tons
Maryland	48,456	Philadelphia	29,648
New York	284,634	Virginia	162,190

LAKE SHIPMENTS

Shipments of anthracite through Sault Ste. Marie Canal for October amounted to 260,188 tons and bituminous shipments were 1,643,283 tons.

FOREIGN MARKETS

GREAT BRITAIN

Nov. 5.—Conditions in the market for steam coals remain quiet. With stocks excessive, it is possible to secure supplies of large and small coals on very cheap terms for immediate shipment, although sellers are not prepared to take such figures for more backward delivery. Quotations are approximately as follows:

Best Welsh steam	Nominal	Best Monmouthshires	$4.32
Best seconds	Nominal	Seconds	4.20
Seconds	$4.32	Best Cardiff smalls	2.52
Best dry coals	5.64	Cargo smalls	1.68

The prices for Cardiff coals are f.o.b. Cardiff, Newport or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—Chartering is very quiet. Tonnage is still scarce and rates strong. Rates are approximately as follows:

Gibraltar	$6.72	Naples	$10.80	St. Vincent	$7.20
Marseilles	10.61	Alexandria	11.76	River Plate	9.00
Algiers	7.76	Port Said	11.76		
Genoa	10.80	Las Palmas	6.60		

Coal Contracts Pending

The purpose of this department is to diffuse accurate information of prospective purchases and prices with a view to affording equal opportunity to all, promoting market stability and inculcating sound business principles in the coal trade.

For the official advertisements of bids wanted see the Contracts-to-Be-Let Section on page 16.

✚Indicates contracts regarding which official information has been received.

Recast

In the following table we give a list of all old contracts coming up for consideration during the ensuing week. The table gives our contract number, the name of the purchaser, city, tonnage and page on which the detail notice appeared:

No.	Purchaser	City	State	Tonnage	Page
1594	County Government	Arvilla	N. D.	100b	736
1611	County Government	Williston	N. D.		786
1628	Newark City Hall	Newark	N. J.	1,000a	828
1633	Central Purchasing Com.	New York	N. Y.	10,000a	829

a Indicates anthracite coal. b Indicates bituminous.

Supplemental Notes

Under this heading additional or supplemental information regarding old contracts appears, together with the page number of the original notice.

✚**1193—Turtle Creek, Penn.**—Bids on this contract (p. 244), which provides for furnishing the township school board with coal were as follows, per bushel: James Queen, lump, 7½c., slack, 4½c.; Jas. J. Young, lump, 8c., slack, 5c.; Geo. L. Shauer, lump, 8c., slack, 5c. Address Secy. Wm. E. Taylor, Patter Township School Dist., Turtle Creek, Penn.

✚**1463—Little Falls, Minn.**—W. H. Ryan and Julius Jetka were the only bidders on this contract (p. 530), both of their bids being $5 per ton delivered at the City Hall. Address City Clk. Victor Schallern, Little Falls, Minn.

1617—Brooklyn, N. Y.—Bids on this contract (p. 786) for furnishing and delivering 3,300,000 lb. of egg coal to various public buildings, courts and baths, were per 1,000 lb.: Bacon Coal Co., $2.96; Thomas W. Woods Sons, Inc., $2.95½; John F. Schmadeke, Inc., $2.85. Deliveries are to be made by Dec. 31, 1915. Address Pres. L. H. Pounds, Borough of Brooklyn, Borough Hall, Brooklyn, N. Y.

1619—Pleasantville, N. J.—Bids have been received on this contract (p. 787), which provides for furnishing the Atlantic County Board of Freeholders with approximately 200 tons of Lehigh Valley pea and 150 tons of stove as follows: Geo. W. Bailey Co., pea, $4.25, stove, $6.38; Williams Darnell & Co., pea, $4.25, stove, $6.40; W. W. Clark, pea, $4.40, stove, $6.50. Address Supt. T. L. McConnell, Pleasantville, N. J.

1626—New York, N. Y.—Bids on this contract (p. 828), calling for the furnishing and delivery of 3,000 gross tons of buckwheat No. 1 for the Bellevue and Allied Hospitals were as follows: Gavin Rowe, $2.93 and Pattison & Bowns, $3.07, per gross ton. Address Board of Trustees, Bellevue and Allied Hospitals, 400 East 29th St., New York, N. Y.

1630—Buffalo, N. Y.—G. Alias & Bros., Inc., report under date of Nov. 15 that no deal has yet been concluded on this contract (p. 828), involving approximately 1,000 tons. Address Pur. Agt. I. Gillespie, G. Alias & Bros., Inc., 965 Elk St., Buffalo, N. Y.

New Business

1634—Granite City, Ill.—The American Steel Foundries Co. of this place are in the market for a contract covering their fuel requirements until Apr. 1, 1917. They require approximately 2,000 tons per month of 1¼-in. screenings and 700 tons of Nos. 3 and 4 washed. Quotations should be submitted f.o.b. their plant on the Terminal R.R. at Granite City. Address Pur. Agt. T. E. Moritz, Chicago, Ill.

✚**1635—Denver, Colo.**—The Custodian of the United States Post Office at this place received bids until 2 p.m., Nov. 19, for furnishing its annual fuel requirements during the ensuing year. The contract involves about 600 tons of a good grade of bituminous coal. Address Custodian B. F. Stapleton, United States Post Office, Denver, Colo.

1636—Chester, Penn.—The Keystone Fibre Co. at this place usually send out inquiries for their annual requirements of best Somerset County coal about Dec. 1, and the contract is concluded Apr. 1. Deliveries are made by Baltimore& Ohio R.R. Address Pur. Agt. Marcy, Keystone Fibre Co., Chester, Penn.

✚**1637—Philadelphia, Penn.**—The Philadelphia County Prison received bids until noon, Nov. 19, for supplying approximately 2,000 tons of buckwheat anthracite coal, to the Reed street and Holmesburg prisons. Bids will be considered only on Lorberry, Lykens Valley, Wyoming or Susquehanna coal. Tenders are also requested on 100 tons of white ash stove coal. For bids and awards on previous contracts of the Philadelphia County Prison see pp. 448, 578. Address, Supt. Fred. A. Cooke, Philadelphia County Prison, 10th and Reed St., Philadelphia, Penn.

1638—Camden, N. J.—The Farr & Bailey Mfg. Co. at this place usually send out inquiries concerning their annual fuel requirements involving approximately 20,000 tons of coal on Nov. 1. Deliveries are made by Pennsylvania R.R. and the contract is let on Apr. 1. Address Pur. Agt. Harwell, Farr & Bailey Mfg. Co., Camden, N. J.

1639—Florence, N. J.—The Florence Thread Co. at this place usually send out inquiries concerning their fuel requirements involving approximately 2,500 tons Somerset County coal on Nov. 1, and the contract is concluded on Jan. 1. Deliveries are made by Pennsylvania R.R. Address Pur. Agt. Thatcher, Florence Thread Co., Florence, N. J.

✚**1640—Lebanon, Penn.**—The American Iron and Steel Manufacturing Co. is receiving bids for a portion of their annual fuel requirements involving approximately 40 000 tons of slack coal. Only a coal running very high in volatile, low in ash, and with sulphur under 1½% will be considered. Address Pur. Agt. George S. Bowman, American Iron and Steel Manufacturing Co., Lebanon, Penn.

1641—Fort Pierre, S. D.—The Board of County Commissioners at this place received bids until 2 p.m., Nov. 16, for furnishing anthracite and bituminous coal in carload lots, bids to include cost of delivery to the Court House. Address Chn. H. L. Jeffries, Bd. of County Comrs., Fort Pierre, S. D.

✚**1642—Bayonne, N. J.**—The City Commissioners will receive bids until 4 p.m., Nov. 23, for furnishing and delivering to the various fire houses and police headquarters, approximately 200 tons anthracite egg and stove coal. Bids are requested only on Wilkes-Barre coal, and a deposit for 10% of the bid must accompany all tenders. Deliveries are to be completed before May 1, 1916. Address City Clk. Wm. P. Lee, Bd. of Comrs., Bayonne, N. J.

✚**1643—Birmingham, Ala.**—The Birmingham Railway, Light and Power Co. contract for their annual requirements of coal, involving approximately 30 tons per day, some time toward the close of the year. Washed slack is required and deliveries are made by railroad. Address Pur. Agt. Chas. P. Doerr, Birmingham Railway, Light and Power Co., Birmingham, Ala.

✚**1644—Maryland, N. Y.**—The Union Free School District No. 2 received bids until 7 p.m., Nov. 8, for furnishing one carload of coal. Address Clk. R. B. Safford, Union Free Schcol Dist. No. 2, Maryland, N. Y.

1645—Wheeling, W. Va.—The City Electric Light Plant at this place contracts some time in December for their annual fuel requirements, involving approximately 3,000 tons of mine-run coal. The business is done on competitive bids, and the customary price is about $1.80 per ton delivered in the bins. Address Supt. W. B. Kain, City Elec. Lt. Plant, Wheeling, W. Va.

1646—Media, Penn.—The Borough Government at this place is in the market for their annual supply of Lykens Valley anthracite pea coal for the year of 1916. Address Clk. Ed. Minton, Media, Penn.

✚**1647—Ada, Minn.**—The Norman County Board received bids until 10 a.m., Nov. 18, for furnishing coal as may be required to the Local Court House during the coming sea-

son. Address County Audr. D. E. Fulton, Norman County, Ada, Minn.

✚**1648—Jersey City, N. J.**—Bids will be received by Hudson County until 3 p.m., Nov. 24, for furnishing coal to the county institutions at Jersey City and in Secaucas County. Address Clk. Walter O'Mara, Bd. of Chosen Freeholders, Hudson County, Jersey City, N. J.

✚**1649—Denver, Colo.**—The Mine and Smelter Supply Co. is requesting bids on a 30- to 40-ton car of Piedmont coal. Quotations should be made f.o.b. Denver. Address Gen. Pur. Agt. W. B. Kinkead, The Mine and Smelter Supply Co., Denver, Colo.

✚**1650—Philadelphia, Penn.**—The Department of Supplies will receive bids until noon, Nov. 24, for furnishing the Police and Fire Department with coal during the balance of the current year. Complete details may be obtained from proposal form, Class No. 175, which may be had upon application. Address Director Herman Loeb, Dept. of Supplies, City Hall, Philadelphia, Penn.

✚**1651—Norfolk, Va.**—The United States Engineers will receive bids until noon, Dec. 20, for furnishing approximately 3,000 tons of bituminous coal. For previous bids and awards on this contract, see contract No. 550, Vol. 7, pp. 709, 1004. Complete details may be had on application. Address United States Engineer's Office, Custom House, Norfolk, Va.

1652—Norfolk, Va.—The Navy Department is requesting bids for furnishing and delivering to the local Navy Yard 600 tons of Connellsville coke. Specifications may be obtained on application for schedule No. 9034. Address Paymaster General, Samuel McGowan, Navy Dept., Washington, D. C.

Contracts Awarded

Note—Successful bidders are noted in **bold face** type.

✚**1360—Hannibal, Mo.**—This contract (p. 411), which provides for furnishing the Board of Public Works with approximately 12,000 tons of coal during the year beginning Oct. 1, has been awarded to the **West End Coal Co.**, of Springfield, Ill., at $1.35 per ton f.o.b. Hannibal for slack, and $1.97 for mine-run. The price at which slack coal was bought last year was $1.34 per ton. Address Supt. A. M. Nipper, Bd. of Pub. Works, Hannibal, Mo.

✚**1555—McKees Rocks, Penn.**—This contract (p. 661), which provides for furnishing the Stowe Township School District with 1¼-in. coal has been awarded to **John B. Beck** at 9½c. per bu. Address Secy. H. E. Emeigh, 907 Russellwood Ave., McKees Rocks, Penn.

1566—Cleveland, Ohio.—This contract (p. 699), which provides for furnishing Cuyahoga County with 2,000 tons of Pittsburgh nut coal, 100 tons of the best grade bituminous lump, and 30 tons of the best Lackawanna egg coal, has been awarded to the **Zettlemyer Coal Co.** Address Clk. E. G. Krause, Cuyahoga County Commissioners, Cleveland, Ohio.

✚**1567—Hettinger, N. D.**—This contract (p. 699), which provides for furnishing the Adams County Board of Commissioners with No. 1 lignite coal has been awarded to **Chas. Hasenwinkle** at $2.90 per ton. Other bids on this contract were: William Fehro, $3; W. A. Overing, $3; W. Hitzman, $3. Address Audr. Walter F. Kelley, Adams County Comr., Hettinger, N. D.

1575—Fountain Springs, Penn.—This contract (p. 700), which provides for furnishing the State Hospital with approximately 2,500 tons of anthracite pea coal, has been awarded to the **Philadelphia & Reading Coal and Iron Co.**, at $2.25 f.o.b. the mine, plus the Pennsylvania State tax. Address Supt. Dr. J. C. Biddle, State Hospital for Injured Persons, Fountain Springs, Penn.

1590—Trenton, N. J.—This contract (p. 736), which provides for furnishing the Pumping Station with approximately 7,000 tons of coal, has been awarded to **The Tattersall Co.**, at $3.60 per ton for 3-in. from the Crow's Nest mine. The contract provides that the coal shall not exceed 8% ash and have at least 14,250 B.t.u. Address City Chemist Parobek, Municipal Bldg., Trenton, N. J.

Contract Notes

Coxsackie, N. Y.—American Valve Co. at this place consumes approximately 600 tons of bituminous and 500 tons of anthracite coal per annum. They have storage capacity for 300 tons, and deliveries are made by railroad.

Daytona, Fla.—The Daytona Public Service Co. consumes approximately 3,600 tons of New River mine-run coal per year, which cost about $5.85 per ton delivered. Address Pur. Agt. H. L. Ogden, 72 Franklin St., Boston, Mass.

Memphis, Tenn.—The contract for furnishing the Park Commissioners with five cars of egg coal has been awarded to the **Brown Coal Co.**, at $4.19 per ton, delivered on switch at McLean Ave. Address Park Commissioners, Memphis, Tenn.

Litchfield, Ill.—The United Gas and Electric Co. at this place consumes about 3,000 tons of Illinois mine-run coal per annum, the approximate cost of which is $1.35 per ton. Purchases are made at the rate of five to ten cars in the open market.

Philadelphia, Penn.—C. Schmidt & Sons Brewing Co., at this place, consume approximately 5,900 tons of bituminous coal per annum. Deliveries are made by railroad as required. Address Pur. Agt. R. McAllister, C. Schmidt & Sons Brewing Co., 127 Edward St., Philadelphia, Penn.

Chicago Heights, Ill.—A charge has been made that the city of Chicago Heights, which recently awarded a coal contract for a large tonnage to the Chicago Heights Coal Co., wrongfully refused to consider the lowest bidder. The difference in the bids is said to have been approximately $380.

Winston Station, N. C.—The Chatham Manufacturing Co. at this place, consume approximately 2,500 tons of Pocahontas coal, deliveries being made by railroad as ordered. The company has storage capacity for 300 tons. Address Pur. Agt. H. G. Chatham, Chatham Manufacturing Co., Winston Station, N. C.

Philadelphia, Penn.—R. T. Morehouse consumes about 10,000 tons of anthracite barley, and 5,000 tons of bituminous coal per annum. He has storage capacity for 20,000 tons, and deliveries are made by water in cargo lots. No contracts are made. Address R. T. Morehouse, Bridesburg, Philadelphia, Penn.

Philadelphia, Penn.—Folwell Bros. Co. consume approximately 10,000 tons of bituminous coal per annum. They have storage capacity for 350 tons, and deliveries are made by railroad at the rate of 150 to 250 tons per week. Address Pur. Agt., E. O. Mangen, Folwell Bros. Co., Third and Cambridge St., Philadelphia, Penn.

Cleveland, Ohio—The Union Rolling Mill Co., at this place, consumes approximately 36,000 tons of three-quarter and 9,600 tons of slack Ohio No. 8 coal. Deliveries are made by railroad at the rate of 3,800 tons per month, and the company has a storage capacity for 500 tons. Address Secy. M. L. Hopkins, Union Rolling Mill Co., Aetna Road and East 82d St., Cleveland, Ohio.

Selma, Ala.—The A. G. Kalin Brick Co., at this place, consume approximately 2,900 tons of pea and slack and 2,000 tons of nut and lump coal per annum. Deliveries are made by railroad at the rate of from two to three cars per week, and the company has a storage capacity for 800 tons. Address Pur. Agt. A. G. Kalin, A. G. Kalin Brick Co., Water Ave., Selma, Ala.

Zanesville, Ohio—Greiner Bros. were the lowest bidders for the coal supply for the operation of the water-works pumping station at this place and will receive the contract. Their bid was $9,450, or $1.34 a ton. The total amount of the bid was $1,100 less than for the same amount last year. Other bidders were T. A. McIntire, $1.45; W. L. Barker, $1.62½; W. A. Werner, $1.65.

Akron, Ohio—Contracts have been let for 11,500 tons of coal for the city. The **Citizens' Coal Co.** will handle the contract for supplying 5,000 tons of bituminous nut and slack for the water-works and 6,000 tons for the garbage and sewage disposal plant, delivery on tracks only, while the **Klages Coal Co.** will deliver 500 tons at $2.80 for the use of the city buildings.

Foreign Notes

Uruguay.—An American consular officer in Uruguay states that a firm desires to represent American manufacturers of coal and coke. Correspondence may be in English.

Spain—An American consular officer in Spain reports that a man in his district is interested in the importation of American coal for steamers, coke, and coal for gas. The man states that he can use at present 2,000 tons of steam coal, 200 tons of coke, and 500 tons of gas coal. Correspondence should be in Spanish.

Brazil—A firm of commission agents in Brazil informs an American consular officer that it would be pleased to represent American manufacturers and exporters. One member of the firm has had considerable experience in the sale of coal and desires to make a specialty of this. Other lines are not specified. Correspondence may be in English.

Financial Department

Central Coal and Coke Co.

This company reports for year ending Jan. 1, 1915:

Department:	Cent. Coal & Coke 1915 Gross	Cent. Coal & Coke 1915 Net	Delta Land & Tim. Co. 1915 Net	Cent. Coal & Coke 1914 Gross	Cent. Coal & Coke 1914 Net
Wholesale coal	$809,188	$392,620	.....	$930,740	$490,742
Retail coal	118,024	10,878	.....	126,999	16,570
Wichita coal	22,608	loss 934	.....	40,251	3,862
St. Joseph coal	13,868	2,521	.....	20,172	7,693
Washer	30,398	loss 1,065	.....	43,116	3,552
Stores lumber dept.	.....	.....	$30,549	.....	.....
Mining stores	.....	127,347	.....	.....	139,872
Rentals, coal, etc., dept.	.....	50,402	3,356	.....	31,494
Wholesale lumber	120,523	43,647	305,824	743,229	305,804
Carson mill	.....	.....	.....	839,051	169,276
Keith mill	.....	.....	.....	529,478	96,503
Miscellaneous	.....	230	.....	.....	22,554
Total	.....	$625,647	$339,730	.....	$1,287,922

INCOME ACCOUNT FOR YEAR ENDING DEC. 31

	Cent. C. & C. Co. 1915	Delta L. & T. Co. 1915	Cent. C. & C. Co. 1914	Cent. C. & C. Co. 1913
Net earnings as above	$625,647	$339,730	$1,287,922	$1,231,472
Deductions:				
Royalty cred. coal lands	$126,120	.....	$126,664	$107,655
Royalty cred. timber lds.	.....	$310,385	339,865	253,679
Deprec'n mill property	.....	65,597	33,987	36,240
Deprec'n washer prop.	4,008	.....	4,008	4,008
Deprec'n Kansas City motor trucks	4,544	.....	4,544	.....
Live stock exting. reserve	11,580	.....	.....	.....
General expense	70,581	44,837	88,819	81,493
Interest on bonds	77,488	52,789	72,990	78,597
Interest and exchange	12,405	17,121	73,041	38,292
Total	$306,726	$490,729	$743,918	$599,963
Surplus earnings	sur $318,921	def $150,999	sur $544,004	sur $631,509
Divs. on pref. stock (5%)	93,750	.....	93,750	93,750
Divs. on com. stock	(3) 153,750	.....	(6) 307,500	(6) 307,500

BALANCE SHEET YEARS END. JAN. 1 (Cent. C. & C. Co.)

Assets	1915	1914	Liabilities	1915	1914
Coal lands	$4,270,527	$4,324,853	Common stock	$5,125,000	$5,125,000
Timber lands	1,737,130	3,526,350	Preferred stock	1,875,000	1,875,000
Coal shafts and bldg.	1,832,939	2,145,579	Bonds	1,258,000	2,059,000
Sawmills and impts.	.....	492,717	Audited bills	589,973	657,262
Yards and equipment	99,227	99,227	Sundry accts.	42,486	88,124
Personal property	142,029	89,290	Pay roll balances	104,159	125,465
Mo. & La. R.R. stock	.....	150,000	Freight charges unadjusted	66,590	82,590
Bev. & So. R.R. Bonds, etc., in other companies	150,000	.....	Sink. fund for ins.	204,308	189,250
Accts. for collection	319,102	160,102	Bills payable	100,000	1,380,000
Inventories	1,848,047	1,788,4637	Proceeds of sale of Delta land and timber bonds	.....	647,832
Cash	276,271	684,701	Undivided profits	1,594,122	1,624,264
Sinking fund	138,816	328,590	Total	$10,959,638	$13,853,787
Sundry balances	75,000	50,000			
	70,550	13,915			
Total	$10,959,638	$13,853,787			

BALANCE SHEET JAN. 1, 1915 (Delta Land and Timber Co.)

(Owning all the timber and lumber properties of Central Coal & Coke Co., which owns the entire capital stock.)

Assets (Total $10,268,466):		Liabilities (Total $10,268,466):	
Timber lands	$8,141,208	Capital stock	$500,000
Mills, machinery and improvements	1,372,617	1st and refdg. M. bonds (V. 98, p. 1002, 841)	1,950,000
Sundry accounts due	127,084	Delta Lumber Co. bonds	750,000
Cash	30,057	Audited bills	154,496
Inventories	308,548	Bills payable	68,000
Deposits for sinking fund	117,495	Timber notes	984,500
Sundry balances	20,710	Pay roll balances	4,162
Profit and loss	150,747	Accrued interest	24,806
		Central Coal & Coke Co.	316,000
		Sundry accounts payable	22,535
		Surplus (unavailable)	5,493,967

The New River Company

President Robt. H. Gross, under date of May 13, reports for the year ended Mar. 31, 1915:

After paying interest on $2,500,000 outstanding bonds and $600,000 outstanding notes, a profit of $17,538 was earned, which compares with a deficit of $57,422 for the preceding year and a deficit of $211,914 for the year ended Mar. 31, 1913.

For the first six months of the fiscal year the output of the mines operated by subsidiary companies increased while the costs were steadily reduced, and the selling price showed a gain month by month, giving good grounds for the hope that substantial earnings would be made for the year. In October, however, the industrial conditions became so badly demoralized that the demand began to show a falling off, which was reflected in a smaller output with an increased cost and a reduced profit.

The output of the mines shows an increase of 128,747 gross tons for the year, and each month from April to October inclusive shows a gain in tonnage. The output for November, December, February and March fell below 130,000 tons per month, and it was in these months only that losses were sustained, showing conclusively that it is necessary to produce and dispose of a tonnage of 130,000 tons or over per month to prevent showing a loss.

General Manager S. A. Scott, reported on May 8, 1915:

Improvements—New equipment has been added in the form of capital expenditure aggregating $235,351. Virginian Power Co. installations to date at the various mines amount to $198,461. Improvements have been made and taken directly into cost, aggregating $39,397.

The new electrical equipment that is being purchased and installed to take the place of the old steam equipment is being gradually put in place. Installations have been completed at all of the mines on Loup Creek and boilers abandoned. In the Cranberry field, the Beckley installation is completed and Beckley and Mabscott mines and a portion of Sprague are being supplied with Virginian power. It is safe to say that two months more will complete the installations necessary for the use of Virginian power at all our mines excepting Summerlee and Lochgelly, and these will be completed by Oct. 1.

Sales of Coal—Sales were made to the extent of practically 2,000,000 tons early in the year. The close of the year showed that most of the customers had taken only 80% of the coal for which they had contracted. Our average net return on lump coal was the same as the previous year; our egg coal showed an increase of 7c. per ton, run-of-mine, an increase of ½c.; slack, an increase of 15c. The combined grades showed an increased return of 3c. per ton.

The retail yard at Cincinnati was disposed of which completes the sale of all our retail yards, and we have already placed for the next year a greater tonnage in Cincinnati than we have ever handled through our yard.

Outlook for 1915—Our sales department has already booked a substantial tonnage, a great deal of it new business, and there is little doubt that we will close contracts aggregating 2,000,000 tons of coal. The mines are in condition to produce coal up to 2,500,000 tons.

OUTPUT AND EARNS. OF SUBSIDIARY OPER. COS. AND AMOUNTS THEREOF BELONGING TO NEW RIVER CO., YRS. END. MAR. 31

	Output (Tons) 1914–15	Output (Tons) 1913–14	Total Net Profits 1914–15	Total Net Profits 1913–14
White Oak Fuel Co.	372,030	373,709	loss $30,458	loss $33,258
New River Fuel Co.	.....	.....	20,823	18,172
Collins Colliery Co.	106,601	116,221	29,622	26,226
Macdonald Colliery Co.	68,533	63,814	4,224	loss 3,558
Cranberry Fuel Co.	194,508	184,618	loss 9,331	6,332
Dunn Loop Coal & Coke Co.	200,546	184,999	66,611	47,024
Harvey Coal & Coke Co.	169,263	133,988	48,295	29,613
Beckley Coal & Coke Co.	86,859	83,740	loss 12,373	loss 14,158
Prudence Coal Co.	139,959	123,852	19,309	1,816
Mabscott Coal & Coke Co	98,410	77,724	27,465	15,270
Price Hill Fuel Co.	.....	6,956	loss 5,783	loss 22,958
Stuart Colliery Co.	174,718	133,059	loss 39,947	loss 27,189
Great Kanawha Collieries Co.	.....	.....	loss 575	loss 11,276
White Oak Coal Co. (wholesale)	.....	.....	8,283	18,172
White Oak Coal Co. (retail)	.....	.....	loss 5,726	loss 13,510
White Oak Railway Co.	.....	.....	1,353	1,507
Piney River & Paint Creek R.R.	.....	.....	14,461	13,412
Total	1,611,427	1,482,680	$136,253	$51,637
	1914–15	1913–14	1912–13	1911–12
New River Co. propor'n of profit and losses of oper. cost. net	prof.$127,174	prof.$46,255	loss$120,676	loss$132,697
New River Fuel Co., profits for year	.....	.....	.....	27,730
New River Co., losses for year	109,636	103,677	91,239	90,822

There was charged off for depreciation $75,226 in 1914-15, against $57,445 in 1913-14, $84,797 in 1912-13 and $65,920 in 1911-12, and also in 1912-13, $11,251 for plants impairment.